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DIAGNOSIS AND TREATMENT OF BASAL CELL EPITHELIOMA.*

With the Report of 59 Cases.

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From the standpoint of the general practitioner, three types of epithelioma most frequently are encountered. These are of the greatest importance from the viewpoint of diagnosis, prognosis, and treatment. We may for the sake of convenience divide epithelioma into three large groups:

1. Basal cell epithelioma, with which we are chiefly concerned in this paper.
2. The prickle cell epithelioma or so-called spino-cell epithelioma which forms pearls.
3. The mucous membrane epithelioma which springs from mucous membrane surfaces.

The second and third groups, namely the prickle cell epithelioma and the mucous membrane epithelioma will be reported on at some future time.

In the first group, basal cell epithelioma or carcinoma, as it is sometimes called, about 90% of the cases appear on the face, chiefly affecting the nose, cheeks, forehead, and eyelids, all notably above a line drawn on a level with the upper lip. They sometimes occur on the hands, arms, legs, shoulders, and abdomen, of which we had one very remarkable case.

Basal cell epithelioma is rare before the age of thirty years and most common between the ages of forty to fifty according to various authors. The ages of our cases were as follows: in the fourth decade there were two cases; in the fifth, nine cases; in the sixth, seventeen; in the seventh, there were twenty; in the eighth, there were eight; and in the ninth there were three. The ratio that usually is given between male and female is three to one. Of our cases there were thirty-seven males and twenty-two females.

The lesions may occur singly but multiplicity of the lesions is noteworthy in this type of growth.

The duration of the lesions in our cases before they came to treatment varied from three months to twenty years.

The first thing noticed by twenty of the patients was a pimple; warts, moles, scaly spots by twenty-three others. Six others did not remember how the lesion began. A history of trauma, either contusion, a scab, or burns was recorded in ten cases.

PATHOLOGY.

In 1903 Krompecher described and gave the name of "basal cell carcinoma" to certain tumors which differed histologically from the ordinary pearl-forming epithelioma. Before this time these tumors were designated by various names, as sarcoma, adenoid epithelioma, and especially by Braun, as endothelioma. Krompecher made a very careful study of the literature but acknowledged that he was much confused concerning what was really meant by the tumors described by different authors.

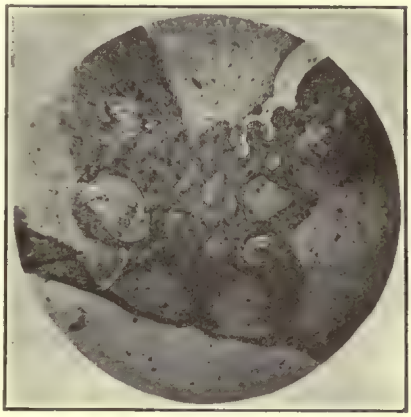
Fig. 1.

Krompecher believed that this type of tumor took its origin either from the columnar basal layer of the epidermis or from the basal cells of the hair follicles or skin glands. The following year Borrman made extensive studies of this type of tumor, agreeing with Krompecher that they were not endothelioma, but true epithelial tumors, but disagreed concerning their origin, believing that they sprang from embryonal nests of the skin epithelium and only became connected with the skin epithelium as shown in Krompecher's illustrations, secondarily. Borrman gave to these tumors the name of "corium carcinoma." Mallory believes that these tumors always spring from the hair matrix cells and has named them "hair matrix carcinoma," It is probable that the site of origin is from the basal cells, either of the epidermis, hair follicles or skin glands and probably quite frequently from the pre-existing benign tumors of the skin glands, and also of nevi, for many of these tumors are accompanied by a preceding history of a nodule existing for a number of years, most always with an increasing rapidity of growth during the few preceding months. One of our lesions showed a distinct transformation from a sebaceous adenoma; and in one other instance these tumors, which were multiple, occurred in the axilla and groin following a chronic seborrhea which had existed for a number of years.

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*From the State Institute for the Study of Malignant Disease. Read at the Buffalo Academy of Medicine, October 2, 1918.

Grossly, these tumors may vary in size from the head of a pin to the size of an orange and while they are usually nodular, they may also be irregular in shape. Very frequently they are elevated and may even be papillar. They are situated superficially in the skin and have a great tendency to ulcerate. On the cut surface they may be solid or may have a cystic appearance.

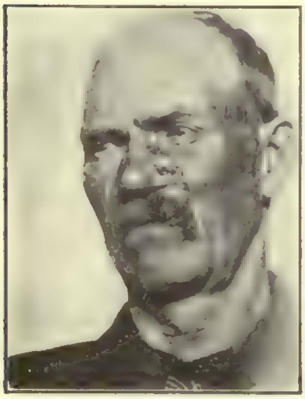

Fig. 2—Before Treatment.

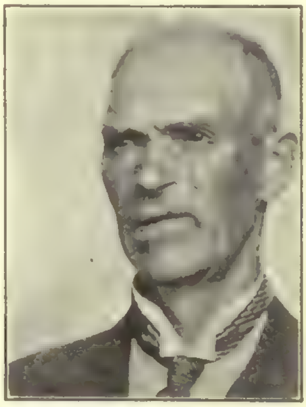

Fig. 3—After Treatment.

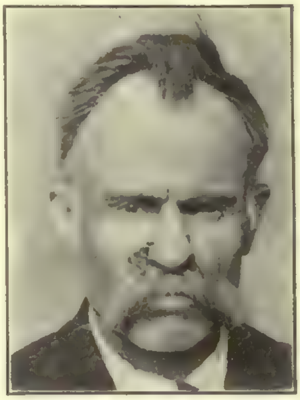

Fig. 4—Before Treatment.

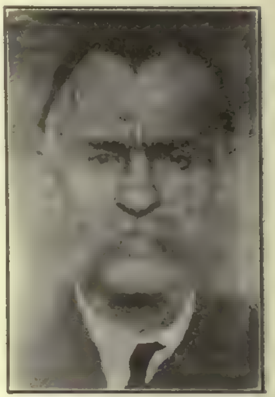

Fig. 5—After Treatment.

Histologically they all may be divided into two general groups: the one, solid and the other, alveolar. The solid variety which comprises 75% of these tumors, is made up of solid masses of cells which have a tendency to form processes which penetrate into the connective tissue of the corium forming a picture which has been likened to point lace. The cells may be round or spindle shaped, depending probably upon pressure and resistance conditions. The alveolar form, which comprises 25%, usually occur with an adenomateous appearance or in some cases may be tubular, in which case the tubules sometimes resemble very strikingly the ducts of the suderiferous glands. Occasionally the alveoli become enlarged, causing a cystic appearance. In about 15% of the cases there were tumors which showed a mixture of these types.

The tumor cell in all types is about the same, being composed of small cells, round, cuboidal or spindle, with scanty protoplasm, and with a deeply staining, solid nucleus. Mitotic figures are very common. The cells arrange themselves on the periphery of the process in such a manner as to resemble very closely the columnar cells in the hair sheaths and also the basal cells in the epidermis. It is probably this resemblance which caused Krompecher to designate them as "basal cell carcinoma." The intercellular connective tissue varies considerably as in all epithelial neoplasms and is probably a biological phenomena, showing the relative rapidity of cell growth between tumor cells and stroma cells. In some cases the intercellular connective tissue predominates and one might refer to these tumors as scirrhus. Metastases have not been observed in this series of cases.

These lesions run a more or less slow course according to the rapidity of the neoplastic growth, the nutrition of the part, and the resistance of the invaded tissue. As long as the epidermis remains intact, that is, as long as there is no ulceration, (in our cases this would include those that were reported as pimples, warts, and moles), the growth is extremely slow. After ulceration has occurred the cells multiply very rapidly. If they are unable to invade the surrounding tissue a fungus-like growth is the result. The lesion may heal in part spontaneously, but never entirely.

The classifications which have been made by different authors based on the clinical aspects represent only different stages in the development of some of the neoplasms, certain factors being common to all of them, only the clinical expression of the disease varying when we speak of rodent ulcer, or rolled edge ulcer, etc. According to the clinical course, some authors divide basal cell epithelioma into seven groups:

1. Flat rodent ulcer.
2. Nodular epithelioma.
3. Rolled edge epithelioma.
4. The depressed scar-like cancer.
5. Morphea-like.
6. Fungating epithelioma.
7. Deep ulcerating.

This is Harry H. Hazen's classification in his book on "Skin Cancer."

I. The flat rodent ulcer is the most common. It begins usually as a reddish or pearl gray, smooth nodule with superficial ulceration taking place early. The ulcerated area is covered by an adherent black or dark brown crust which, from time to time, drops off or is picked off by the patient. When this occurs there is slight bleeding and the ulcerated area becomes larger. The growth is always slow and may take from one to ten years to attain the diameter of one to two centimeters. Induration is always present. On inspection with a hand lens small pearly nodules can be seen just at the edge of the ulceration. The skin around the edge looks shiny and is under tension. The tissue beneath the scab looks like ordinary *granulation* tissue. If this lesion is undisturbed or ineffectually treated one of several things may happen; first, there may be widespread superficial ulceration with or without the formation of fungating tumor masses (like group 6); second, there may be invasion and destruction of the neighboring tissues resulting in large ulcerating cavities which may become secondarily infected with the ordinary pus-forming organisms or putrefactive bacteria. In one of our cases the orbital cavity was involved with complete destruction of the orbit. In two cases the aural cavity was invaded, in one case, the auditory meatus and, in the other, invasion of the temporal bone and mastoid cells with the destruction of the tables of the skull; and later an infection of the meninges which resulted in death. Thirdly, an attempt at healing may take place with the formation of a depressed scar, as in the fourth group, described by Hazen. The edge of the ulcer is slightly elevated and always indurated, the induration being due to the inflammation which usually exists, as well as the multiplication of cells. The diagnosis in the early stages of these growths may be confused with hyperkeratosis, or more rarely some of the simple inflammations. After the ulceration appears, syphilis and lupus vulgaris must be considered.

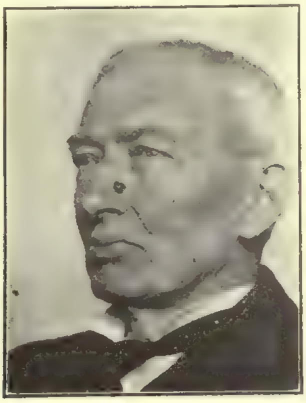

Fig. 6—Before Treatment.

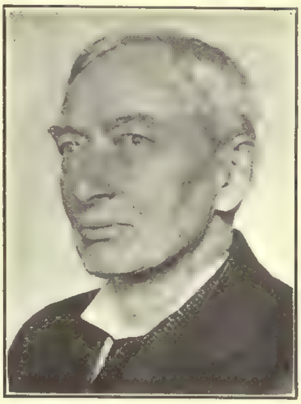

Fig. 7—After Treatment.

II. The second group of Hazen's, the nodular type, usually arises from a preëxisting lesion which the patient may describe as a pimple, a wart, or a mole. A pearly nodule first forms and grows slowly, which in the course of a year or two may attain the size of one centimeter and be elevated above the surrounding skin. It is hard and firm to the touch, of a white or greyish appearance, with small dilated vessels running into the tumor. Later ulceration occurs and assumes the type of a rodent ulcer.

III. The rolled edge ulcer. We have observed one case on the abdomen. They grow much more rapidly and may be slow to ulcerate. These growths have a distinct semi-globular edge with a depression in the center, the edge is extremely hard and the skin over it is tense, thick, and shiny. There are numerous dilated vessels extending into the normal skin. The late course of this type of basal cell epithelioma is the same as that of the two preceding types.

IV. The depressed scar-like epitheliomas usually start as a small subepidermal nodule, the skin over it remaining intact. They commonly are seen on the cheeks and temples. The nodule flattens out and slowly spreads below an edge of rete and as a result the appearance is identical with that of a depressed scar.

V. The morphea-like epithelioma has been described in detail by Heidingsfeld, *Journal Cutaneous*

Diseases, 1913, *XXXI,* 379. These lesions start as small nodules situated on the temples or malar eminences and are sharply defined and spread very slowly, taking four or five years to reach the diameter of one to two centimeters. They are sharply defined lesions with slightly elevated pearly border, the center white or yellow-white and depressed. The edges are very hard to the touch and the center feels leathery. There may be smaller ulcerated areas along the edges or in the center of the growth. We have not observed this type.

VI. The fungating basal cell epithelioma is usually caused by the cells proliferating more rapidly than they can invade, so that the growth must necessarily be outward. The surface may be smooth and resemble anemic granulation tissue, although they bleed at the slightest provocation. This type of tumor must be differentiated from the rapid-growing fungating type of pearl forming epithelioma as well as from some of the granulomata, granuloma pyogenicum, blastomycocis, and simple exuberant granulation tissue.

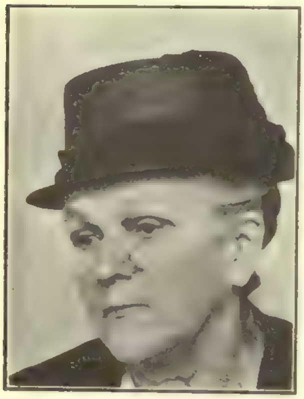

Fig. 8—Before Treatment.

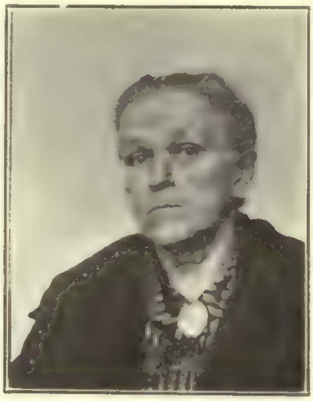

Fig. 9—After Treatment.

VII. The deep ulcer type is usually the result of injudicious treatment. The base of the ulcer is usually very irregular, with much discharge of pus of a foul odor, and the patient is toxic from absorption. Death usually takes places from hemorrhage or infection.

In the diagnosis of basal cell epithelioma, the following points are important: first, its location; second, the spontaneous origin of the lesion, from a pimple, wart, mole, or scaling skin (hyperkeratosis); third, the slow growth; fourth, the induration which exists no matter how small the lesion is; fifth, the progressive nature of the lesion, attempts at healing but never healing entirely; sixth, metastases are rarely if ever observed; seventh, biopsy, this being the only positive way of distinguishing between basal cell epithelioma and early prickle cell epithelioma in which there is no metastasis.

As the basal cell epithelioma of the skin is a superficial tumor, it, therefore, does not seem difficult to destroy all cancerous tissue and thus obtain a permanent cure. Even rather advanced cases are amenable to treatment. The infrequency of metastases increases the chances for a permanent cure, yet in spite of this there are among our cases many who had previously received medical attention without success. *X*-ray, caustics, and the thermocautery had been used or the tumor had been removed surgically. The effect was either a speedy recurrence after temporary healing, or a more rapid extension of the lesion.

For the treatment in our cases we used the following procedures, either alone or combined: fulguration, excision, radium and *x*-ray treatment.

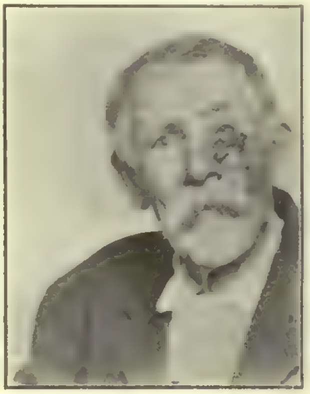

Fig. 10.

Fulguration has only a local effect which is practically the same as cauterization or coagulation of the tissue. It does not possess any advantage over the thermocautery in the treatment of basal cell epithelioma. We treated only two cases with fulguration. One of them healed promptly within 23 days, the other was fulgurated several times but remained stationary and healing at last was obtained by radiation.

Six basal cell epitheliomas were excised. All patients so treated were healed and remained well, some of them for more than three years. This success may be explained by the fact that we operated only on carefully selected cases. Not all cases, owing to their size and location, causes dealt with surgically.

In 19 cases we applied radium. We used it in the form of radium bromide, of which 51 mgs. were applied in metal applicator. In 9 cases the treatment was successful and a clinical cure has been obtained. One of these cases, however, sustained a severe radium burn which healed only after eight months. In another case of this group it is doubtful whether the success can be ascribed to the effect of the radium alone. This patient with an ulcerated lesion on his nose had been fulgurated twice without success. Then he received within sixteen days two mild erythema doses of unfiltered x-rays, whereupon his lesion showed considerable improvement. Eight days after the last x-ray treatment, before the full effect of the x-rays had time to develop, the ulcer was radiated for three hours with radium. It is, therefore, not improbable that this lesion might have healed without the radium application. The favorable influence of the radium rays in the successful treatments could usually be noticed after two weeks, while it took from 1-2 months from the beginning of the treatment until the lesion had disappeared. One patient is still under treatment, almost well. In the nine remaining cases the radium treatment did not prove satisfactory. Some of these showed at first some improvement, but then remained stationary; in one case the ulcer even progressed. Three of these cases which were refractory to radium were later on treated with x-rays and were healed promptly. On the other hand, among these nine cases were four which had not responded to many applications of x-rays and which also could not be influenced by radium. Our success with radium in basal cell epithelioma (50%) is, therefore, not very encouraging. Perhaps the amount of radium at our disposal is not sufficient for all cases, though it was large enough to produce a burn; perhaps we have not yet found the proper technic as to the filtration and doses of the radium. It is also possible that the failure of the radium treatment in some cases is due to the quality of the radium rays; their wave-length is probably too short and their penetration too high to be sufficiently absorbed by the tissue.

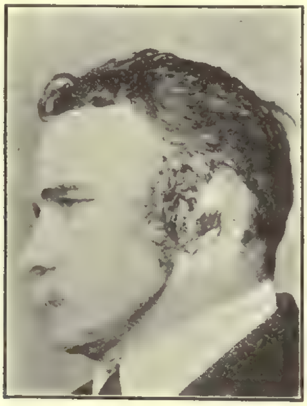
Fig. 11.

Fifty-four cases have been treated with x-rays. They can be divided into two groups. The first group contains thirteen cases which were treated with fractional filtered and unfiltered x-ray doses of varying penetration. Most of these cases showed a slight erythema; four of these thirteen cases remained refractory after temporary improvement. The other nine cases were pronounced clinically well within 3-10 weeks and are well at this time.

The second group contains forty-one cases, eleven of which are still under treatment. With these the was to destroy, if possible, with a single erythema dose all carcinomatous tissue. All were ulcerated, and in all the ulcerated lesion healed. In only one instance the scar remained slightly elevated. It is to be regretted that this patient did not report for further observation and treatment. All other cases (97%) healed with scars that were quite satisfactory from a cosmetic point of view. The deliberately produced erythema of the skin did not inconvenience the patient in any way and disappeared after 2-3 weeks. The first improvement was usually noticed 1-2 weeks after the application of x-rays. The time required for healing varied between 3 and 6 weeks and depended upon the size of the new-growth. The time necessary for healing was prolonged somewhat in two patients who suffered from very extensive tumors which had already invaded the deeper layers of the subcutis.

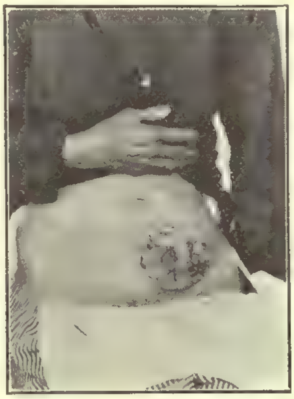
Fig. 12—Before Treatment.

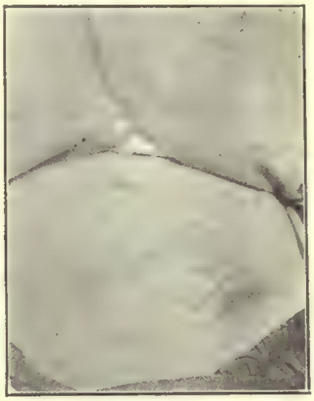
Fig. 13—After Treatment.

The difference between these two groups is too great to be overlooked and speaks decidedly in favor of the so-called "massive dose treatment," which consists of few rather powerful applications, as recommended by MacKee and Remer and by Pusey. The treatment with frequent small doses, the so-called "fractional dose" method, originated from the idea that it would not damage the healthy skin and tissue overlying the tumor. Of course it is absolutely necessary to pay strict attention to the skin when giving the so-called "deep x-ray treatment," but the basal cell epitheliomas of the skin are more or less superficial tumors of the cutis and subcutis that ulcerate and, if not cured, will destroy the skin progressively and much more thoroughly than it could ever be damaged by two or three erythema doses given at intervals of 3-4 weeks. It is a well known experience of all who treat neoplasms with *x*-ray or radium that tumors may become resistant against radiation by the application of many small doses and then will continue their destructive growth uninfluenced. We have several such cases in the first group of our *x*-rayed patients. In our opinion the risk of underdosing when treating with *x*-rays is usually very much under-rated. The consequence of underdosing in a skin epithelioma is much more serious than a marked acute erythema of the skin that disappears in 2-3 weeks without leaving any trace. It is, moreover, not at all impossible that the hyperemia of the skin produced by the erythema influences favorably the progress of healing. Though we know very little at present about the mechanism of healing after *x*-ray treatment, it is conceivable that besides the destructive effect of the rays on the cells, cytolysins which are present in the blood may play an important part. From this point of view a deliberately produced hyperemia may therefore increase the direct effect of the *x*-rays. We can absolutely limit the effect of the rays to the smallest possible area by using proper diaphragms and by covering the surrounding skin with sheets of rubber impregnated with lead. The only danger is that we may choose too small an area, the consequence of which will be a recurrence.

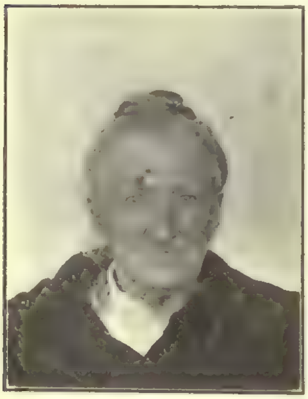
Fig. 14—Before Treatment.

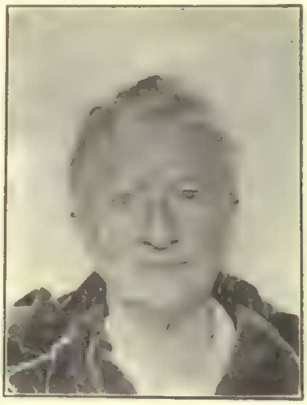
Fig. 15—After Treatment.

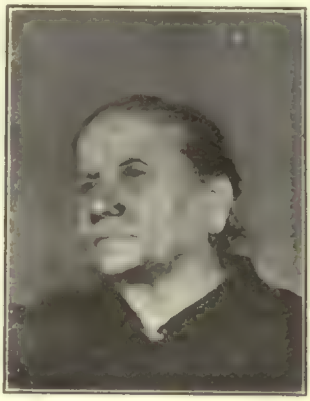
Fig. 16—Before Treatment.

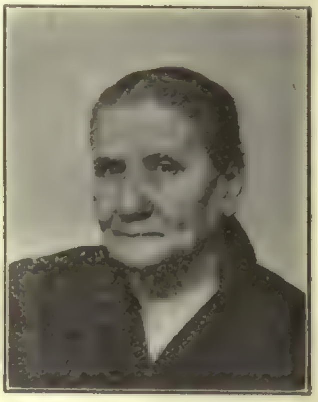
Fig. 17—After Treatment.

When teating skin epitheliomas, as a rule, we do not use any filter, so that all rays may be brought to bear upon the lesion. The hardness of the rays, which depends upon the hardneses of the tube, and which can be changed at will when a Coolidge tube is used, varies in our treatments according to the depths in which the rays shall be absorbed. The effect of the rays is probably greatest in those tissue layers where they are absorbed, not in those which they penetrate. For tumors in the cutis and superficial layers of the subcutis we use rays of 3-5 Benoit penetration. In large fungous tumors we used rays of 6-8 Benoit penetration.

When treating according to these principles, many of our patients required only one erythema dose for a clinical cure; some rather advanced tumors required repeated radiation, which was given at intervals of about three weeks. In one oase of an unusually large fungous tumor we repeated the erythema dose at intervals of a few days to two weeks until the epithelioma undoubtedly showed signs of regression. No damage to the skin was done, special care for its protection having been taken.

A comparison of the different methods of treatment which we used gives the following result:

Excision	100%	clinical	cures
Radium application	50%	"	"
X-ray application,			
fractional dose method	69%	"	"
massive dose method	97%	"	"

The highest percentage of clinical cures has been obtained by surgical procedure and by heavy *x*-ray treatment, both of which a patient can get everywhere without great expense.

When shall we advise a patient to be operated? When shall we apply *x*-rays?

The excision of a basal cell epithelioma is usually only a minor operation which can be made under local anesthesia. If done aseptically the wound heals within 8-10 days with a linear scar. The condition essential for such a perfect result is that we can operate within healthy skin and yet have sufficient skin to close the defect. It is the consideration of the cosmetic effect which so often causes the surgeon to fail to reach the safety zone. Sometimes the localization of a basal cell epithelioma is unfavorable for exciison, e. g., the nares, the tip of the nose, the nasolabial grooves. That our percentage of clinical cures is higher with operative treatment than with *x*-ray treatment is due to the fact that we only operated on carefully selected cases while cases were admitted to *x*-ray treatment just as they came in, whether beginning or advanced.

It is an advantage of the *x*-rays that they can be applied on all parts of the body surface and against lesions which are so far advanced as to be inoperable. The time necessary for healing is decidedly longer than that with an operation, but the chances for complete success are much greater. Almost unconsciously we expose the *x*-rays a much larger area of healthy skin than we would excise in an operation. In order to excise all malignant tissue which *probably* may exist in the neighborhood of lesions, we usually have to sacrifice large portions of healthy skin, while, when using *x*-rays, the healthy skin which has been exposed to the rays remains intact and yet all malignant tissue beneath it has been destroyed.

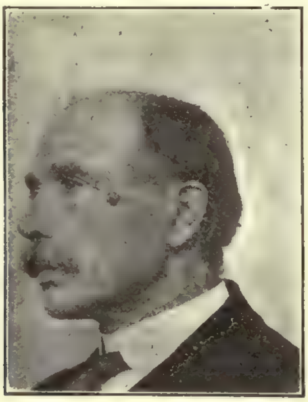

Fig. 18—Before Treatment.

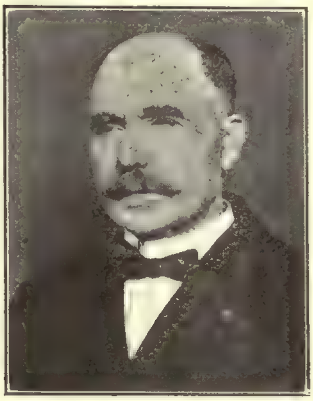

Fig. 19—After Treatment.

There is one dangerous feature in *x*-ray treatment of skin epitheliomas, and that is the tendency toward underdosing. As long as we treated with numerous small *x*-ray doses the percentage of our clinical cures was only 69% and we saw a few cases become refractory against the rays. On the other hand since we instituted massive dose treatment we have had 97% of clinical cures and we have not met one basal cell lesion that was refractory. Among our patients were quite a few who had had *x*-ray treatment elsewhere without success and who only reluctantly submitted to a renewed *x*-ray application. One or two erythema doses were sufficient in every one of them to produce a clinical cure. At present we no longer operate basal cell epitheliomas except for purposes of research. We treat them with erythema doses of *x*-rays and are well satisfied with the clinical results. When we emphasize the danger of underdosing, we do not mean, however, to recommend a reckless indiscriminate radiation of skin cancers with the causation of severe burns. What we advocate, is the application of such doses of *x*-rays as will secure the maximum destructive effect on the cancer cells and yet do no permanent injury to the skin. This dose has been reached with our machine and our treatment tube when a simple erythema of the surrounding skin appears after a few days. It is true that this massive dose treatment can only be given by experienced radiologists, who are well acquainted with the output of their *x*-ray equipment and know the erythema doses of their individual tubes and for the different kinds of rays.

We know well, of course, that a clinical cure is not yet a permanent cure. As to the length of time which must elapse after a clinical cure has been obtained and before a permanent cure can be pronounced, opinions differ widely. Experience shows that the closer all cases of epithelioma with clinical cures are followed, the more this period of observation must be prolonged. Without entering into a discussion of this difficult question, it does not seem improbable that in explaining especially later recurrences, not only anatomical local factors (incomplete destruction of the lesion) have to be considered, but also the resistance of the whole organism against the development of malignant neoplasms. More recent researches into the etiology of cancer seems to indicate that in the development of cancer, besides local factors as chronic irritation, chronic infection, misplaced cells, etc., a more general change in the cell-metabolism of the whole organism also plays an important part. This, too, holds true for the basal cell epitheliomas of the skin, and makes us hesitate to pronounce a permanent cure, even after years of observation. Moreover, the multiplicity of primary basal cell tumors in an individual is an established fact. Such a microscopic primary focus may be present and be unnoticed in the neighborhood of a larger lesion and escape treatment. It continues to grow and will later cause an apparent "recurrence." As basal cell tumors are usually of exceedingly slow growth this may take years.

The period of observation of our patients varies between several months and 3½ years. For pronouncing a clinical cure it is not sufficient that an ulcerated lesion is simply healed over. One of our patients had a small ulcerated epithelioma in the cheek. It was treated with many small *x*-ray doses without success, but healed over after two applications of radium, leaving a slightly elevated scar. During months of observation this scar did not show any sign of clinical recurrence. For reasons of research the scar was excised and we found beneath the new formed skin some still malignant tissues of basal celled type. Very often slight elevations or thickenings remain at the site of the healed lesion. These thickenings have, therefore, to be looked at with the greatest suspicion and the treatment has to be continued till they have absolutely disappeared. With this precaution, a recurrence will be very exceptional. We have at various times excised such scars and examined them microscopically, and have never found any sign of malignancy.

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GALL-STONE DISEASES COMPLICATING PREGNANCY.

Aimé Paul Heineck, M.D.,
Chicago, Ill.

A careful analysis of the reported cases of cholelithiasis complicating pregnancy, taken in conjunction with my clinical experience in analogous cases, justifies, I believe, the following conclusions:

1. Gall-stone disease occurs with far greater frequency among women than among men; with far greater frequency among women who have borne children than among women who have remained sterile. Its period of greatest incidence is the child-bearing period.

2. Gall-stone disease, alone or associated with one or more other related or non-related pathological state, not uncommonly complicates a pregnancy otherwise normal or abnormal.

3. The first manifestations of cholelithiasis may date from the existing gestation or from a previous pregnancy; may precede, coincide with, or follow an abortion or premature labor, accidental or induced.

4. All conditions that are associated with, that favor or cause: (a) bile stasis; (b) inflammatory or degenerative changes involving the gall-bladder or bile tracts; (c) pathological alterations in the composition of the bile, such as hypercholesterinamia, etc., predispose to gall-stone disease.

5. Bacterial organisms are said to be the most essential cause in the majority of gall-stones. In this connection one should not ignore the relation of mouth and teeth infections to appendicitis and cholecystitis.

6. Pregnancy is an important etiological factor in the causation of cholelithiasis.

7. The pathology of gall-stone disease complicating pregnancy is the pathology of gall-stone disease occurring in the non-pregnant. There may be present: (a) an inflammation of the gall-bladder or bile ducts in which one, two, or many calculi are lodged, or impacted; (b) a distention of the gall-bladder or bile ducts by mucus, pus, or calculi; (c) a pericholecystic inflammation, calculous in origin, leading to adhesion formation, to fistula formation, etc.; and corresponding disturbances of function; (d) changes in the liver; (e) changes in the pancreas.

8. Stones may precede the presence of inflammatory changes in the gall-bladder, may be associated with and be the cause or effect of cholecystic inflammation, slight, moderate, or severe.

9. Some of the symptoms of gall-stone disease are due to the irritation inherent to the presence

of gall-stones, to their migration through, or impaction in the bile ducts or neck of the gall-bladder. Other symptoms are due to the concomitant inflammation of the gall-bladder, bile ducts and neighboring organs, causative of, or resulting from the presence of calculi.

10. Rupture of a gall-bladder distended by calculi, by fluid, mucous or purulent in nature, can occur during gestation or during or immediately after labor.

11. To arrive at an accurate diagnosis, it is important to have: (1) an exact history, including the record of previous attacks of hepatic colic; (2) to determine the location of the pain and tenderness and the nature and radiating character of the former; (3) to make a thorough examination, including a careful inspection and palpation of the abdomen, especially of the hypochondriac region; (4) to exclude such pathological conditions as simulate gall-stone disease, lead colic, renal colic, duodenal ulcer, nephrolithiasis, chronic appendicitis, movable kidney, infection of the genital tract.

12. In the differential diagnosis of this condition, one should bear in mind:

a. That not infrequently gall-stone disease originates during, or may complicate pregnancy;

b. That cholelithiasis and cholecystitis, owing to their reflex symptoms, are often mistaken for gastric disease;

c. That appendicitis and gall-stone disease frequently co-exist;

d. That digestive disturbances associated with acute pain and tenderness in the right hypochondriac region, with or without jaundice, with or without symptoms of biliary colic are in themselves ample justification for operative exploration of the gall-bladder and ducts.

13. Cholelithiasis is a surgical disease; it calls for operative relief. Medical measures in this disease are merely palliative; appropriate surgical measures are curative.

14. Gall-stone disease is in itself never an indication for the artificial termination of pregnancy.

15. Whenever, for some cause or other, the abdomen is opened, in women of the child-bearing age or past the child-bearing period, the gall-bladder and larger bile ducts should be examined if it can be done: (a) without or with only slight traumatizing of the tissues; (b) without exposing the patient to too much additional risk; (c) without contaminating a clean peritoneum. Should the patient give a history of chronic digestive disturbances the indication is absolute.

16. Women exposed to pregnancy, suffering from calculous cholecystitis or any other form of gall-stone disease, should be operated upon, the calculi removed, and the gall-bladder drained.

17. Pregnancy does not contra-indicate operations upon the gall-bladder or bile tracts. Peterson reported only 3 miscarriages in 23 reported operated cases. In only one (Roith) of the cases which we considered, did abortion follow the operation.

18. It has been repeatedly demonstrated that the operative relief and cure of cholelithiasis does not unfavorably influence gestation, does not unfavorably influence parturition. Icterus, whether acute or chronic, is a constant menace to the fetus.

19. Early operation is now, in proper hands, a safe procedure. It is an effectual cure of the symptoms produced by gall-stones; it has a low mortality and guarantees against serious complications in the future.

20. Cholecystostomy, cholecystectomy, and choledochotomy have been successfully performed upon pregnant women for the relief of gall-stones. After these operations, drainage is to be employed until the bile ceases to flow spontaneously through the wound, until complete subsidence of whatever degree of cholangitis existed.

21. Cholecycystostomy is the operation of election:

1. Whenever the patient's condition is so bad that the difficulties attending a cholecystectomy render its performance unsafe.

2. When the gall-bladder is not seriously damaged and when the cystic duct is not ulcerated or narrowed by stricture. It is believed that the gall-bladder has some other function than that of a mere receptacle of bile.

3. When the common duct is strictured.

4. If jaundice and pancreatitis be present.

22. Cholecystectomy is indicated:

1. For very thick, acutely inflamed, or gangrenous gall-bladders in which a stone is impacted in the cystic duct.

2. For chronically thickened gall-bladders. A thick walled gall-bladder which has become functionless should always be removed. When the gall-bladder becomes thickened and hardened from long continued inflammation, it is manifestly impossible that it should dilate no matter what obstruction there may be in the common duct.

3. For large gall-bladders distended with clear fluid and resulting from the impaction of a stone in the cystic duct.

4. For the "strawberry" gall-bladder chronic thickening with ulceration.

5. For a calculous gall-bladder adherent to the stomach, intestine, or omentum.

6. When the walls of the gall-bladder are so modified by disease that neither the storage nor the expulsion of bile is possible.

23. It is agreed that cholecystectomy is attended with more technical difficulties than cholecystostomy. It requires greater care to avoid injury to the bowels, vessels and the main bile ducts. It is wiser to choose the safer operation until the technic of the more complicated one has been mastered.

24. The prognosis of operative intervention is not unfavorably influenced by the existence of pregnancy.

25. In persistent gall-bladder disease, pathologic changes in the urine, manifested by the presence of casts and albumen, are not uncommon and are not necessarily a bar to operative interference.

Whirlpool Baths.

The whirlpool baths, first used in France during the war, are the most valuable single appliance in the after-treatment of wounds. The arm or leg is plunged into a vessel containing water at about 105 degrees which is circulated by jets, set at an angle, or by a propeller. Air is also introduced so that the limb is surrounded by a swirling, bubbling current, the temperature of which is raised as high as 120 degrees if the patient can bear it. The air bubbles increase the stimulant effect on the skin and the heat is applied to the surface far more surely by this means than if the water were still. These baths are particularly effective for painful stumps, painful scars, partial paralysis or in fact any condition which lowers the circulation and nutrition of the member. The period of treatment is about twenty minutes and the part, made warm and comfortable, is then ready for massage and manipulation, which could not have been performed without this preparation.—R. Tait McKenzie, M. D., Major, R. A. M. C., in *American Physical Education Review.*

The Prevention of Gas Pains.

1. Clinical and experimental observations strongly suggest that preoperative purging is a strong factor in the producing of gas pains.

2. At operation the strongly purged bowel is more difficult to handle than the unpurged bowel on account of congestion and distention.

3. An enema will clear the lower bowel sufficiently for any operative work.

4. Patients who have not been purged are comparatively free from gas pains.—L. A. Emge, M. D., in the *Journal American Medical Association.*

UROGENITAL TUBERCULOSIS; CASE REPORT.

Claude G. Hoffman, M.D.,
Louisville, Kentucky.

In October, 1917, a man twenty-four years of age, from the interior of Kentucky, was accepted for service in the United States Army and sent to one of the training camps. According to the history obtained from the patient, about a week after reaching the camp he developed a severe cough, with elevation of temperature, night sweats, etc., and shortly thereafter had a pulmonary hemorrhage, two or three teacupfuls of blood being expectorated.

Examination of his sputum at that time disclosed abundant tubercle bacilli, and the diagnosis of pulmonary tuberculosis was accordingly made. The patient was then sent home, where I understand he was treated by the family physician in the routine way, *i. e.*, by the internal administration of drugs, by being kept in the fresh air, proper attention to diet, personal hygiene, etc.

During January and February, 1918, he complained of pollakiuria, vesical tenesmus, etc., and since October, 1917, had lost about seventeen pounds in weight. I might mention, in passing, that he gave the history of Neisserian urethral infection two years previously, for which he was treated and pronounced cured.

March 14th, 1918, when I first saw him he had acute urinary retention; his prostate was found so large that satisfactory palpation was impossible, and no cystoscopic examination could be made. The prostate was hard and nodular, and the diagnosis of tuberculous involvement seemed certain. The prostatic infection was secondary, and the case shows the rapidity with which tuberculous involvement of the urogenital tract may develop from the original pulmonary infection. It is interesting to note that the pulmonary lesion had remained practically quiescent during the time the patient was being treated at his home. Only the middle lobe of the right lung showed any appreciable physical signs, cough had been slight, and temperature about normal.

During my examination of the prostate I must have ruptured a small intra-capsular abscess, because about half a dram of pus was expressed from the urethra. Microscopic examination of the pus revealed the presence of tubercle bacilli in great abundance, and culture of the same material showed staphylococcus albus and gram negative bacilli probably B. coli. As the culture showed a mixed infection an autogenous vaccine was prepared from the prostatic excretion under the belief that its administration might produce some benefit. After the second injection of vaccine the patient's temperature became normal and remained so until he was sent home on April 20th.

This man returned to Louisville June 1st, 1918, suffering severe pain in the prostatic region and also in the right testicle. Examination showed that there had developed during his absence a typical right epididymo-orchitis. Temporizing methods of treatment were employed until June 30th, when indications of suppuration and tissue destruction appeared, two small scrotal sinuses having developed.

On July 8th an incision was made through the scrotal wall and tunica vaginalis exposing the testicle and spermatic cord, which were found densely adherent to the tunica vaginalis and incorporated in a mass of caseous material and pus; there was not an area of uninvolved testicular tissue larger than a pea. The entire mass was excised the cord being ligated and divided three inches above the external abdominal ring. The progress of the case was uneventful, the wound healing without sinus formation. The patient was sent home August 8th, with instructions to report in about a month for further observation.

By September 10th he had gained fourteen pounds in weight. Examination showed the prostate perceptibly decreased in size, and while it was still hard and nodular it was not sensitive to palpation. The urinary stream was free and there was no tenesmus. The patient was able to retain his urine eight hours without discomfort. Cystoscopy at this time revealed a typical tuberculous bladder; much difficulty was encountered in locating the ureteral orifices on account of the trabeculations. Urethral catheterization was finally accomplished and unilateral (right) renal tuberculosis demonstrated. Cystoscopy also showed both lateral lobes of the prostate protruding into the vesical cavity.

On October 2nd, 1918, epididymo-orchitis developed on the previously unaffected (left) side; the patient suffered intense pain, and the swelling and tenderness extended at least four inches above the internal abdominal ring. His temperature at this time varied between 101° and 102°F. Temporizing methods were used until October 24th. During the interim anorexia was marked and the patient lost about sixteen pounds in weight.

On October 24th he was again operated upon. The left testicle and cord were found in about the same diseased condition as the right had previously been. The whole mass was removed, the cord being ligated as high as possible. The second day after the operation the temperature became normal, appetite returned, and steady improvement has continued until the present date, November 5th, 1918. The patient has gained six pounds in weight and says he feels well.

My principal reason for reporting this case is to show the rapidity with which urogenital tuberculosis may sometimes follow the primary pulmonary infection. Of course the prognosis is exceedingly grave. Strange to say, the pulmonary lesion has remained quiescent, there having been no cough nor other symptoms referable to the lung for at least four months.

SELF-GOVERNMENT BY INTERNES.

The medical service of the modern hospital is not only a place for fitting young men recently graduated from our medical colleges to care properly for the sick; it is also an educational institution. At the termination of an internship these men go forth to engage in the activities of life with a personal responsibility, each one acting his part in the many medical, social and economic problems, each an honored member of a noble profession. In order best to meet these obligations young men need to have placed upon them, during the years of preparation for life service, responsibilities associated with their training and experience. Self-government, as it appears to me, has a practical application in its relation to young men; I might say, equally so to young women; and I predict that a modified form of self-government will in the near future be introduced in many of our hospitals and schools of nursing.—CHARLES B. BACON, M. D., in *The Modern Hospital.*

SOME DON'TS FOR BURNS.

There are some things that should not be done to a burn, and some of them are these: Never use an antiseptic of any kind on a burn except of the mildest sort, because its caustic action will eat off the new cells and cause a maximum of scar tissue formation; never use salves or grease of any kind, as they will surely cause sloughing and infection; never allow the cotton or gauze in your dressing to come into contact with the wound, as it will act as a mechanical irritant and the new cells growing into the meshes will be pulled off when the dressing is removed; never apply a powder or dry dressing, as the serum will dry, forming a crust under which it will rapidly stagnate and decompose.—C. T. THOMPSON *in the International Journal of Surgery.*

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JANUARY, 1919.

NINETEEN HUNDRED AND NINETEEN.

A Happy New Year is the cordial wish of the AMERICAN JOURNAL OF SURGERY, not merely to its subscribers, but to the entire medical profession.

As the affairs of the Nation and the world tend to reach equilibrium, may there be a complete resumption of medical activities along normal lines. The accomplishments of surgery during the war reflect most creditably upon the profession. Ninety per cent. of the wounded attended within six hours after injury recovered. Ninety-five per cent. of those who reached base hospitals were restored to lives of relative usefulness. Probably less than ten per cent. of all the injured during American participation will require re-education in order to fit themselves into the scheme of life prepared to cope with all circumstances. This signal victory of the constructive forces of the Medical Department reflects the enthusiasm and devotion of the military surgeons.

From the trials of war to the tests of peace there is but little transition. The current of medical life flows on, laving the shores lined with the afflicted with its healing waters.

May 1919 be a year enriched by discovery, distinguished by service, and fraught with the highest benefits to humankind, and may the medical profession find an imperishable reward of honor and glory in its efforts and achievements.—I. S. W.

THE NEWER LUNG SURGERY.

Those who were fortunate enough to hear the addresses of the visiting foreign surgeons at the College of Physicians and Surgeons and at the New York Academy of Medicine in the early November days will not soon forget these memorable occasions. They were all inspiring addresses, especially in the setting of spontaneous patriotic fervor that marked those days. They were set forth with a remarkable lucidity and grace of diction; charged with big and novel surgical principles and bearing a message of profound import not only to war surgery, but to surgery of civil life.

The remarks of these surgeons could easily furnish sufficient material for a dozen editorials, but we have selected for comment in this number their experiences in lung surgery, because this was perhaps the most startling feature in their addresses. This phase was beautifully set forth by Major Duval, the daring originator of the latest treatment of wounds of the chest and lung, whose French, by the way, was worth going miles to hear. He traced the evolution whereby his present methods were obtained and no one could accuse Duval of Chauvinism when he pointed out that certain German principles, such as the teaching of the exaggerated dangers of artificial pneumothorax and the necessity of handling the lung with special instruments, had retarded the progress of lung surgery appreciably. In the early days of the war expectant treatment of lung wounds had proven disastrous, as a mortality of 45 per cent. eloquently testifies. The stimulus to Duval's temerity in treating lung wounds was afforded by the discovery of the now well established principle of treating war wounds (also, we believe, first originated by French surgeons) by excision of traumatized tissues and primary sutures. He, therefore, applied this principle to the treatment of lung wounds and soon found that the lung, like other tissues of the body, need not be handled with the timidity with which it had hitherto been accustomed. He also found that the dangers of an artificial pneumothorax had been tremendously exaggerated. Essentially, therefore, the method devised by Duval consists in wide exposure of the chest cavity, producing a complete pneumothorax with prolapse of the lung: pulling out and exposing each lobe of the organ, and treating the wound in the same manner as a wound in any other part of the body, followed by complete closure of the thoracic cavity, without drainage.

With this technic, wounds of the lung are treated according to three indications: 1. Hemorrhage.

2. Threatening asphyxia. 3. When the lung wound was such as to probably promote infection. In the first two indications, the method resulted in the saving of 65 per cent. of the men threatened with death from hemorrhage. In the chest wounds with lung lesion, the danger came from infection from the wound itself or from the foreign body. In this class of cases, the mortality had been reduced from 30 per cent. to 9 per cent. As an indication of the marvelous possibilities that this method brings with greater surety of indication and technic, Duval cites the fact that in *the last 33 cases. of lung wounds there was no death.* In addition, the cure obtained by this method is better than that obtained by any other method, because it left the function of the lung perfect. Truly, it may be said, that Duval's work is a revelation.

Bastianelli, the renowned Italian surgeon, corroborated all of Duval's assertions, and in addition, made a recommendation of his own, which, it seems to us, will prove to be a large contribution in the treatment of lung wounds. He advises in certain cases of closed lung wounds with intrapleural hemorrhage that, instead of making an artificial pneumothorax and closing the lung wound, the blood be aspirated and at the same time air be introduced into the pleura so as to keep up the compression, which, in Bastianelli's experience, is the dominant factor in arresting pulmonary hemorrhage. His statistics certainly prove his contention. In 290 cases of penetrating wounds, death occurred in 18. 206 of these patients had closed chest wounds, and of these seven died; 84 had open chest wounds, of whom 11 died.

Our interest in this topic has aroused us to look up the original papers of Duval, so that we might inform ourselves more thoroughly concerning the details of the principles, technic and indications, of which the above summary is merely a bare outline. We find that the best resumé of his work is published in *War Surgery and Medicine,* June, 1918, Vol. 1, No. 4, published by the Surgeon General. We advise everyone interested in this fascinating field to read this report.—E. M.

THE ETIOLOGY OF THROMBO-ANGIITIS OBLITERANS.

The condition named Thrombo-Angiitis Obliterans, by Buerger, has never been fully understood or explained. Why the disease should attack males, particularly Jews of the poorer classes of Eastern Europe; why it should choose as its site nearly always the feet, are questions that have received but little light. The studies of Buerger have been generally accepted, and it has been conceded that the pathology is one of thrombotic obliteration of the blood vessels to the extremities.

In 1916 Willy Meyer suggested that patients suffering with this disease would benefit when treated by repeated injections of Ringer's solution. At that time, too, he quoted Garbat, who demonstrated that these patients might all be classed in one group, according to the iso-agglutinins in their circulating blood. There seemed, therefore, even at that time, a strong likelihood that the clinical manifestations might be attributed to a common underlying etiology.

Quite recently Willy Meyer has announced that in these patients the ingestion of 100 gms. of glucose by mouth, will always produce a hyperglycaemia. He, therefore, names the disease "glycophilias." It would thus seem that there is a metabolic fault responsible for the disease, and that we must look in a new direction for a proper appreciation of its etiology. H. R. M.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

Iron, Steel and Safety.

In few fields of industry has there been greater or more successful effort to reduce accidents than in connection with the manufacture of iron and steel. *Bulletin 234* of the *United States Bureau of Labor Statistics* deals with "The Safety Movement in the Iron and Steel Industry, 1907 to 1917." This period practically embraces the entire time period of the Safety First Movement.

The accident rate during 1907 was unusually high and the intrinsic hazards in the iron and steel industry were recognized as so important as to warrant an attempt at mitigating the dangers to employees. The idea of accident prevention had not been sponsored by any large organization and legislation for accident compensation had received comparatively little attention. Slowly, however, there developed in the iron and steel industry an increasingly vigorous attack upon accident rates which has resulted in almost a steady decline during the period of ten years, with the exception of a slight upward movement occurring about the middle of 1915 because of the introduction of new labor elements and the migration of labor from place to place under the unusual conditions created by war, then well under way across the ocean. The very trials and stresses incident to the production of war materials served as a test of the efficacy of the Safety First Movement. In some branches of the industry the accident rates continued to decline, while in other branches the accident rates mounted rapidly. Where organization for the prevention of accidents was most effective, the increased industrial activity did not result in very high rates, and within the year the disability rate began to decrease again, despite the fact that the number of workers employed was continually increasing.

The accident experience of one large steel plant will suffice to indicate the excellent progress which has been made in the iron and steel industry, despite the fact that it represents an organization above the average level of the entire industry. In 1905, with 6,406 300-day workers, the accident frequency rate (per 1,000, 300-day workers) was 300, while the accident severity rate (days lost per 300-day worker) was 34.5. In 1914, the number of 300-day workers had fallen to 4,741 with an accident frequency rate of 74, and an accident severity rate of 12.2. For 1917, the same plant possessed 10,862 300-day workers, with an accident frequency rate of 85, and an accident severity rate of 12.9.

The accident severity rate is a much truer index of accident hazard than is the frequency rate as it demonstrates the influence of the injury upon the welfare of the workers and upon the productive activity of the industrial plant. These figures calculated for a group of plants, constituting about 25 per cent. of the entire iron and steel industry of the country, show a decrease of the accident severity rate from 27.1 in 1907, to 10.9 in 1914, and 10.2 in 1917. For the same group of plants, the accident frequency rate fell from 242.4 in 1907, to 112.7 in 1914, and 81.0 in 1917. The frequency rate thus declined 67 per cent., while the severity rate decreased 62 per cent.

It is patent that in any industry various departments will present different rates of accidents and severity. The main factors entering into these differences consist of, first, the intrinsic hazard of the department; second, the flux of industrial workers; third, the efforts made at accident control.

The effect of the war period up to 1918 may be measured in part by a consideration of fatality rate in the industry and the general frequency rates from 1913 to 1917. In December, 1913, with 153,098 300-day workers the fatalities per 1,000 300-day workers were 1.34, while the total accident rate was 181.0. In December, 1914, these figures were respectively 117,214, 70, and 130.4. By June, 1916, the figures had risen to 160,819, 1.09, and 134.1. It is evident that while the general frequency rate increased, it was by no means as rapidly as the rate of employment. About the middle of 1916, the total accident rate began to decline and a little later the fatality rate began to fall, despite the fact that employment was continuing to increase. This downward movement of accident rates becomes more significant when one realizes that the general tendency is toward an increase in the accident rate when recovery from industrial depression demands the introduction of new men as workers. Therefore, the fact that in December, 1917, there were 186,357 300-day workers with a fatality rate of only .98 and a total accident rate of only 103.4 is all the more creditable to the successful accomplishment of the Safety First Movement in the industry.

Compensation laws and the organized Safety First Movement have given marked stimulus to plant managers who have begun to appreciate that accident prevention possesses economic as well as humanitarian benefits. Laying aside the consideration of the human factor in accident occurrence, it is manifest that serious industrial accidents may be greatly reduced by the improvement of physical plant and by securing conditions of employment that make for safety in spite of human carelessness, ignorance, and dereliction.

The progress of the Safety Movement in the iron and steel industry, which, incidentally, possesses intrinsically the greatest industrial hazards, offers a challenge to the industrial world and marks an understanding of the value of human life such as has not been fully appreciated in various other fields of human labor. The iron and steel industry, humanitarianly speaking, becomes the bulwark of accident prevention as it has been economically a stronghold in the support of national activity and progress.

POISONING BY AUTOMOBILE FUMES

To prevent poisoning from automobile fumes the following precautions should be taken: Have good ventilation; do not run the motor in a small, insufficiently ventilated garage; do not run it unnecessarily; put alcohol and glycerine or some other nonfreezing mixture in the radiator; use good gasoline; do not use too much oil. If you must work in a confined space wear a gas mask or attach a rubber hose to the end of the exhaust to carry the fumes off outside. A warning sign should be posted in every garage. Future improvements in the automobile to prevent sickness and deaths from automobile fumes might be a tank to absorb the poisonous gases or a practical electric battery for out of town use.—H. J. BLUMENSOHN, M.D., in *The Medical Record.*

Book Reviews

Abstracts of War Surgery. Prepared by the Division of Surgery, Surgeon-General's Office. Octavo of 430 pages. St. Louis: C. V. Mosby Company, 1918. Price, $4.00.

This volume contains abstracts of the war literature of general surgery that has been published since the declaration of war in 1914. The abstracts are listed under the following headings: general topics; wound infection and treatment; tetanus; abdomen; chest; cardiovascular surgery; joints; fractures; burns; anaesthesia in warfare; trench-foot; peripheral nerve injuries; jaws and face. The abstracts have been very excellently done and many of the original papers have been reviewed in these columns on previous occasions. For those interested in military surgery the volume is helpful in furnishing a rapid method of reaching all the available literature of the present emergency on the required topic.

Gunshot Fractures of the Extremities. Joseph A. Blake, Lieutenant-Colonel, Medical Corps, U. S. A. Small octavo of 150 pages and 40 illustrations. Paris: Masson et Cie, 1918.

This small monograph was originally intended to form part of a large work to be prepared by Doctor Stimson for the Council of National Defense. It details the experiences of Colonel Blake—and these have been very extensive in the treatment of gunshot fractures of every variety. Some of the matter contained in the volume had been previously published in French and American journals, and some of these have been previously reviewed in these columns. The volume is very complete and should be of great help not only to military surgeons, but also to the civil practitioner, since many of the principles made us of could be used advantageously in civil injuries of the bones. Much space is given to the suspension method of treating fractures.

Books Received

Les Borgnes de La Guerre Prothese Chirurgicale & Plastique (Valois et Rouveix). Par Le Dr. G. Valois Membre de la Societe d'Ophthalmologie de Paris. Planches Hors Texte Dessinees Par G. Reynard De La Societe Des Artistes Francais. Masson Et Cie, Editeurs. Libraires de L'Academie De Medecine 120, Boulevard St.-Germain, Paris, VI. 1918.

Gunshot Fractures of the Extremities. Joseph A. Blake, Lieutenant-Colonel, Medical Corps, U. S. A. Masson Et Cie, Editeurs. Libraires De L'Academie

The Doctor in War. Woods Hutchinson, M.D. With De Medecine 120, Boulevard St.-Germain, Paris, 1918. illustrations. Boston and New York: Houghton Mifflin Company. The Riverside Press, Cambridge, 1918. Price, $2.50.

Applied Bacteriology. Studies and Reviews of Some Present-Day Problems for the Laboratory Worker, the Clinician and the Administrator. Edited by C. H. Browning, M.D., D.P.H., Director of the Bland-Sutton Institute of Pathology, the Middlesex Hospital. Contributers: C. H. Browning, W. Gilmour, R. Gulbransen, T. J. Mackie, S. Russ, J. F. Smith, L. H. D. Thornton. Henry Frowde, Hodder & Stoughton, *Oxford University Press,* Warwick Square, E. C., 1918. Price $2.50.

Progress in Surgery

A Résumé of Recent Literature.

Open Pneumothorax: Its Relation to the Treatment of Empyema. Major E. A. Graham and Capt. R. D. Bell, *American Journal of Medical Sciences, December,* 1918.

Graham and Bell carried out an extensive and painstaking series of animal experiments to prove the thesis laid down by the empyema commission that the empyema resulting from streptococcus hemolyticus infection should be treated by the method of deferred operation. One of the principal considerations which led to this opinion was the question of harm to the patient caused by the creation of a pneumothorax in the presence of an already existing severe asphyxia. The work was carried out according to the following lines: 1. A study of the effects of open pneumothorax in normal and diseased chests. 2. Experimental production of streptococcus empyema and pneumonia. 3. A study of the effect of early operation in dogs with experimentally produced empyema. The results obtained from their observations confirm those which the commission derived from their clinical experiences.

The authors summarize their results in the following manner: From the standpoint of pressure relationships the normal thorax may be regarded as one cavity instead of two. Any change of pressure in one pleural cavity is accompanied by practically an equal change in the other, so that an equilibrium of pressure exists at all times throughout the whole thorax. In our experiments the changes of intrapleural pressure have been accomplished only with air, but probably the same conclusions would hold for those effected by fluid

The prevalent conceptions of pneumothorax are erroneous in that they are based on the assumption that when an opening is made into the chest one lung is collapsed and the other maintains respiration. This assumption implies that the mediastinum constitutes a rigid partition between the two pleural cavities. On the contrary, the mediastinum is so mobile that any increase of pressure in one pleural cavity pushes it over into the opposite one so that both lungs are compressed practically equally. No such condition is possible, therefore, of collapse of one lung and maintenance of respiration with the other in a chest with a normal mediastinum.

If, on the other hand, the mediastinum has been made rigid by induration as a result of long-standing inflammation, or if it has become fixed by adhesions, then a pleural opening on one side will not produce the same pressure changes in both pleural cavities.

The maximum opening into a pleural cavity compatible with life depends upon a definite relationship which exists between the amount of air entering the lungs and the amount which enters the pleural opening. The maximum opening compatible with life may be approximately determined for the normal chest by the mathematical expression given in the text. By this mathematical expression it is found that a normal human adult should be capable of withstanding for a short time an opening of about 51.5 sq. cm. (5x10 cm., or 2x4.1 inches). There is no discrepancy, therefore, between our experimental results and the finding at the front that men are capable of maintaining respiration with gaping thoracic wounds, which seem surprisingly large.

A double pneumothorax in a normal chest is more dangerous to life than a unilateral open pneumothorax merely because usually the combined areas of the two openings (and therefore the amount of air admitted into the pleural cavities) is greater than a single opening on one side is likely to be. Theoretically and experimentally effects of practically the same severity result in the case of one or more opnings into one pleural cavity as follow the creation of a double pneumothorax, provided that in each case the combined areas of the various openings are equal.

The bearings of these results and deductions upon both the treatment of acute empyema and upon thoracic surgery in general is obvious. Whenever the amount of air taken into the lungs is limited by the presence of an active pneumonia, with plugging of both air channels and alveoli, whenever there is an excessive demand for air, or whenever there is sufficient weakening of the respiratory muscles to impair compensation, the size of a pleural opening compatible with life becomes smaller; and if any or all of the above factors are present in sufficient intensity, even a very small opening into the pleural cavity will produce death from asphyxia. Since all of these factors are likely to be present to a high degree during the early stage of an empyema of the streptococcus type, early operation with the establishment of an open pneumothorax carries with it an unwarrantable danger. Aspiration is indicated instead until after the above dangerous factors have disappeared.

Special emphasis has been placed in this article on the changes of intrathoracic pressure induced by an open pneumothorax, but other results, such as heat loss, danger of infection and disturbance of the systemic circulation, are of great importance.

A Study of 450 Cases of Wounds of the Chest, with Special Reference to a New Method of Treatment for Infected Hemothorax. W. Hutchinson, *The Canadian Medical Association Journal*, November, 1918.

1. All cases of wounds of the chest should be treated in special wards or special hospitals.
2. Careful charts should be kept which record temperature, pulse, and respirations four times a day.
3. Early diagnosis of infection is important.
4. Every case in which there is more than two fingers' breadth of dullness should be aspirated.
5. Cases of open pneumothorax should be closed as early as possible.
6. Cases in which there is a large amount of clot in the chest should be opened, blood and clot evacuated and the chest closed. This should be done as early as possible.
7. Cases in which the haemothorax is found to be infected should be opened, washed out and closed; some antiseptic being left in, preferably an emulsion of B. I. P. in liquid paraffin.
8. Post-operative aspirations must be done in all closed cases the first forty-eight hours after operation.
9. No attempt should be made at the Base Hospital in France to remove a foreign body from the lung.

Primary and Delayed Primary Suture in the Treatment of War Fractures. William S. Baer, *American Journal of Orthopedic Surgery*, August, 1918.

The particular object of this paper is to emphasize the importance of the early treatment of war fractures by primary or delayed primary suture. It diminishes considerably the anger of infection and the hospital stay. It increases the rapidity of healing and convalescence and return to function and does away with the pain and discomfort of repeated dressings.

Les Lois de la Cicatrization des Plaies Cutanees (The Laws of the Cicatrization of Cutaneous Wounds.) Auguste Lumiere, *Revue de Chirurgie*, January-February, 1918.

Lumiere summarizes the rules as follows:

1. The activity of healing in a wound kept aseptic is the same at the beginning and at the end of the healing.
2. The time necessary for healing depends on the size of the wound.
3. Traumatisms and contamination of the wound retard the epidermization.
4. The employment of antiseptics assures the regularity of the healing.
5. The various antiseptics exercise a different action, depending on their nature, on the rapidity, or retardation, of the cicatrization.
6. Under aseptic conditions the extent of cicatrization corresponds to 1 in 20 or 1 in 30 mm., daily. Under antiseptics this was diminished to 1 in 72 mm.

The Use of Dichloramine-T and a Modified Open-to-the-Air Treatment of Burns. Capt. W. E. Lee and Capt. W. H. Furness, Philadelphia, *Therapeutic Gazette*, May 15, 1918.

The entire burned area is covered with a single layer of open meshed mosquito netting which has been previously impregnated with paraffin wax. This netting is usually easily removable without causing any pain; if it adheres it may be easily loosened by spraying with sterile paraffin oil. In addition a one or two per cent solution of dichloramine-T in chlorinated melted paraffin wax is sprayed over the entire burned area. If the burned area is extensive, a few electric bulbs properly placed in the bed prevent undue radiation of the body heat. The authors have treated 50 burns by this method, and are convinced of the utility of their method.

Anesthetic Machine. A. W. Adson and G. G. Little, Rochester, Minn., *Journal American Medical Association*, June 8, 1918.

Adson and Little describe an intratracheal anesthesia apparatus, especially adapted to be employed in work on the cerebellum and brain stem, where plenty of pure air under slight pressure is often required. The one described has been constructed to supply a constant flow of air, when needed, a constant ether tension, and a safety valve prevents too great pressure within the lungs. They claim for this machine efficiency, simplicity and ease of manipulation The description is elaborate and requires the illustrations, to which constant reference is made.

Bismuth Paste in War Surgery. Emil G. Beck, M.D. *Annals of Surgery*, April, 1918.

The methods of primary sterilization by means of flushings with hypertonic solutions should be thoroughly tested, to determine their effectiveness without the additional use of pastes

The radical excision of infected tissues, as now practised in the war hospitals, should be adhered to, as a means of preventing chronic suppuration.

In those cases in which early sterilization was not obtainable and the wounds persist in suppurating, the bismuth paste injection or similar formulae should be employed, before another radical operation is resorted to.

Correct technic in applying bismuth paste is essential if satisfactory results are to be obtained.

Bismuth paste and similar formulae are applicable in chronic suppurations resulting from war wounds, as well as in those due to chronic infectious diseases.

In the residue of cases in which the bismuth paste treatment is not effective, the sutureless skin operation should be employed, since with this method we are able to clear up nearly all of these apparently hopeless cases.

Hemorrhagic Osteomyelitis and Sarcoma in Bone. George Barrie, *American Journal of Orthopedic Surgery*, November, 1918.

It is demonstrated that the same type of scavenger giant cell is frequently present in lesions in bone that are purely inflammatory in character, as well as in true sarcomata of bone. The term medullary giant cell sarcoma should be abolished. The diagnosis of tumor structure should be made from the predominating tumor structure. Granulation tissue proliferation filling in bone cavities should be recognized as inflammatory tissue.

Affections of the Large Joints Due to Gunshot Wounds; Their Late Results and Treatment. S. W. Leeds, *British Journal of Surgery*, October, 1918.

For the restriction of motion following gunshot injuries, manipulation has its chief use in the correction of deformity, and in changing a bad to a useful position of the ankylosed joint. Slight movements and continuous stretching accomplishes more than sudden forcible movements. Open operation is rarely advantageous except with the elbow. Active movements are most valuable and often do more than any other method of treatment.

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January

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RECENT STUDIES IN POSTOPERATIVE PNEUMONITIS.*

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During the past three years an intensive study has been carried on in the Presbyterian Hospital, New York City, in postoperative pulmonary complications. In particular, more attention has been paid to Postoperative Pneumonitis. This has been carried on along three lines,—clinical, bacteriological and Roentgenological. During these three years, there have been 160 cases of Pneumonitis observed in the surgical service, an incidence of 2.4 per cent. This rather large number of cases is due undoubtedly to the fact that a vigilant lookout has been kept on every postoperative case showing any signs or symptoms of a pulmonary complication.

In practically every admission to the surgical service in the years 1916 and 1917, a preoperative bacteriological examination of the sputum by means of mouse inoculation was carried out. Any case developing a pulmonary complication had a postoperative examination made of the sputum for comparison with the preoperative, and every case developing signs or symptoms of a pulmonary complication was radiographed to determine the presence of a shadow in the lung plate. Daily notes and examinations of the chests were recorded and in this way far more attention was paid to the determination of the complication than is customary in most hospitals.

The fact that the usual type of postoperative pneumonia is a Pneumococcus IV lesion, short in duration, terminating by lysis and frequently without any marked subjective symptoms, accounts for the large number of cases that are overlooked in the majority of surgical services. The sudden rise in temperature which so frequently accompanies this complication and which usually appears within the first forty-eight hours, is usually spoken of as *postoperative reaction* and unless the careful examinations mentioned before are made in these cases, the true nature of such reactions is not determined.

There are many phases to the problem of postoperative pneumonitis and these have been discussed at some length in the author's paper on "Postoperative Pneumonitis" in *Surgery, Gynecology and Obstetrics,* Vol. XXVI, January, 1918. Briefly the factors associated with the complication may be defined as follows:

A.—PREDISPOSING FACTORS.

1. Season.—The complication is much more common in the winter and early spring months and the incidence curve corresponds to that of medical types of pneumonia.

2. The presence of a concurrent inflammation or the history of a recent inflammation of the upper respiratory tract, such as coryza, pharyngitis, tonsilitis, laryngitis and bronchitis.

3. Exposure of patients to changes in temperature, or currents of air during the admission routine of bathing, preparation for operation, enemas and the exposure of patients during or at operation to moisture, currents of cold or damp air and sudden changes in temperature.

4. Inhibition of the respiratory movements, especially abdominal respiratory movements, the result of the abdominal incision with its accompanying pain and tenderness and postoperative distention, and tight binders.

5. Cyanosis during or immediately after the operation, resulting in pulmonary congestion.

6. An improperly given general anesthetic, permitting mucus accumulation in the pharynx, with improper position of the head and obstruction of a free air passage.

The relaxed palate and posterior position of the tongue, evidenced by stertorous breathing, causes a churning of the mucus and this results in a freeing of bacteria from the crypts of the tonsils in the oropharynx. Experiments have shown that sputum specimens coughed up from the larynx before operation show relatively few or no pneumococci, whereas mucus aspirated from the glottis after an hour of anesthesia shows countless numbers of pneumococci when injected into mice. This is particularly true of the Pneumococus IV which are saprophytic in the majority of the throats of healthy individuals during the late winter and early spring months.

B.—EXCITING CAUSES.

Bacteriologically the Pneumococci IV have been found in some 50 per cent. of the cases developing a pneumonitis, either in preoperative or the postoperative specimens of sputum. Pneumococcus of the four groups was recovered in some 70 per cent. of the cases in postoperative pneumonitis. From serum agglutination tests and from the urine precipitin tests as well as from the mouse inoculation studies of pre- and post-operative sputum, it is safe to say that the great majority of postoperative pneumonias are caused by the Pneumococcus IV. These bacteriological observations agree with the clinical findings which show that these pneumonias are of short duration and of relatively low mortality, corresponding in a general way to the atypical group IV pneumonias which are seen in the medical wards.

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PROPHYLAXIS.

The predisposing factors give the clue to the prophylaxis in dealing with the complication. During the winter and spring months especially, patients should not be operated upon, unless there is no choice, where there is a history of recent or concurrent cold. Eliciting this part of the patient's history is almost invariably neglected in the average hospital. More attention should be paid to the stay in the hospital, especially immediately before, during and the first two or three days after operation. Too much of this part of surgical treatment is left to inexperienced nurses and orderlies.

Counter-irritation of the chest, immediately following operation is of value in combating the initial pulmonary congestion. A preliminary treatment of the throats of patients during the 12-24 hours preceding operation by means of 2 per cent. Dichloramine T in Chlorcozane, according to the method of Dunham and Dakin in their treatment of meningococcus carriers in the army, is now under investigation in the Presbyterian Hospital, but not enough cases have been tried to draw definite conclusions. The rationale of the method in temporarily reducing the pneumococcus and other pathogenic bacteria in the oropharynx is certainly sound, and the method should give good results.

As regards the anesthetic, the complication followed after operations under ether, chloroform, gas-oxygen and local anesthesia, where no general anesthesia of any kind was used. This is definite proof that no one general anesthetic is the exciting cause and the complication should not be called an ether pneumonia nor an anesthetic pneumonia. The complication in a patient having a cold or an upper respiratory tract inflammation is more apt to follow ether anesthesia and the author believes that this is due to the fact that ether is more irritant to an inflamed oropharynx and mucus accumulation is more liable to occur in these cases. It is the churning of the mucus in such a throat, with the saturation of this mucus with pathogenic organisms, especially the pneumococcus, that makes the patient more liable to descending infection of the bronchi. This tendency to mucus accumulation is of course largely dependent upon the lack of skill in administering the anesthetic, especially during the induction stage and the failure to maintain a smooth and even degree of anesthesia. It is a well recognized fact that the complication is found less frequently in cases anesthetized by experienced and skilled physicians. It is, however, the duty as well as the natural inclination of the modern expert anesthetist, to fit the anesthesia to the patient, and to use, if possible, chloroform or gas oxygen, where a general anesthetic is required in a case giving the history or signs of a concurrent inflammation of the respiratory tract, rather than to adhere to the narrow rule of using ether for all cases.

The management of the head and the jaw and the depth and evenness of anesthesia need not be emphasized to such a gathering as this, for during the maintenance of anesthesia, the skilled anesthetist plays his part well. It is the period immediately after operation, while the patient is regaining his laryngeal reflex and is recovering from the anesthesia, that is too often left to the management of inexperienced members of the nursing and hospital staff. How frequently does one see a patient leaving the operating room on a stretcher in the dorsal position, cyanotic and gurgling or stertorous, perhaps vomiting, while the nurse tries to keep the jaw forward, but seems unaware of the fact that the oropharynx is blocked with secretions.

Dr. Thomas L. Bennett of New York, in his wonderfully instructive discussions on anesthesia has for many years emphasized the importance of keeping the patient turned on his side while on the stretcher and for the first few hours after operation. This position is always an easy one to maintain, the head can be held on the side in a natural and easy manner, the air-passages are free and the patient does not aspirate pneumococcus laden sputum, to say nothing of vomitus. To the mind of the author, this one precaution is the most valuable of any that has been suggested, and since making this a rule at the Presbyterian Hospital, pneumonia incidence has definitely decreased. The prevention of the aspiration of pneumococcus laden sputum, by whatever means, is the most important measure that can be employed by the anesthetist, and he should constantly endeavor to see to it that this is carried out, both in and out of the operating room. Other measures, but of less importance, following operation, are breathing exercises, the Gatch or Fowler positions and the frequent turning of patients, especially the feeble and aged ones, the use of counter-irritation to the chest by means of a mild rubifacient, Prevention of aspiration of oropharyngeal secretions and pulmonary congestion, and re-establishing the relatively normal aeration of the lung, should be the aim of surgeon and the anesthetist in dealing with the problem of Postoperative Pneumonitis.

Discussion.

Dr. John W. Seybold, Denver, Col.:—Dr. Whipple did not emphasize sufficiently the danger of postoperative pneumonia precipitated by unqualified anesthetists. If the incidence of postoperative pneumonitis is so great in a hospital supplied with skilled anesthetists, what must it not be in institutions employing non-medical and unskilled persons as anesthetists. It is no wonder such hospitals lack the courage to publish their records. If surgeons really wish to protect their patients, as well as their statistical records, they should secure the most competent anesthetic service available and see to it that their anesthetists are not only licensed and qualified physicians or dentists, but that they are expert in their work and interested in providing exceptional service. While making the rounds of various clinics during this Chicago meeting I was not only impressed with the large number of non-medical persons giving anesthetics, but I was even more surprised at their almost entire lack of skill and knowledge. Judging by what I saw I would have no hesitation in saying that the incidence of postoperative pneumonia, as well as other untoward anesthetic effects, must be very great in these clinics. What purports to be the open drop-method of etherization, in the hands of these non-medical anesthetists, degenerates into a dousing with ether, irrespective of the patients conditions or the requisite depth of anesthesia necessitated by the operation. All patients are carried to and beyond the point of ether depression. Surgeons who are satisfied with such anesthesia, because it masks the trauma of their style of operating, have as yet to learn the advantages of the velvet touch, joint preparation and after-care as well as a depth of anesthesia just sufficient to overlap the necessary reflexes of the operative procedure without unnecessary and always dangerous ether saturation.

Dr. Ralph M. Waters, Sioux City, Iowa:—In reading a paper, recently, before the Iowa State Medical Association, I had occasion to allude to the use of the non-medical anesthetists as a result of false economy, or necessity because properly trained and efficient medical anesthetists were not everywhere available. A surgeon in discussing my paper acknowledged that he had taken up local anesthesia to protect his patients from the disastrous effects of incompetent anesthesia especially by half-trained non-medical persons. If we are to eliminate postanesthetic complications it is vitally important to put enough qualified anesthetists into service not only to meet the demand for them, but to protect the public from the results of incompetence.

Dr. Isabella C. Herb, Chicago, Ill.:—The incidence of postoperative lung complications seem to be greater after certain operative procedures rather than certain methods of anesthesia if properly employed. Thus septic cases are most prone to develop postoperative pneumonias. Next in order follow operations on the stomach and gall-bladder, probably on account of partially suppressed pulmonary ventilation. We are very careful in maintaining body heat during operation and in preventing exposure of the operated patient at any time. As our method of drop-ether does not produce mucous secretion it is not an appreciable factor in causing inspiration pneumonitis.

Dr. E. I. McKesson, M. D., Toledo, Ohio:—Conservation of body heat before, during and after operation is essential in the prophylaxis of postoperative lung complications. An operating room temperature lower than 80° invites trouble and I have repeatedly refused to give anesthetics to patients for operations in operating rooms not sufficiently heated. The most difficult period of the year is between seasons when adequate heat is not always obtainable. The patient should also be protected from methods of anesthesia which produce profuse sweating, as in this condition, exposure, while being returned through draughty corridors or being put back to bed, induces cutaneous shock and results in pneumonia. In Toledo the frank postoperative pneumonias are confined to one hospital, where they occur in the spring and fall and are no doubt due to a cold operating room.

Dr. Wm. Hamilton Long, Louisville, Ky.:—All anesthetic apparatus should be thoroughly cleansed before being used on another patient, especially when, in the previous case, mucous secretion has been profuse. There is in a lack of cleanliness and sterilization the danger of transmitting pulmonary infection. Patients can best be protected from exposure by being wrapped in warm blankets before leaving the operating room and they should always be returned to a previously warmed bed.

Dr. W. B. Howell, Montreal, Canada:—Dr. Long's point is important, but difficult to put into effect in casualty clearing stations. Surgeons and anesthetists often have to work in sweaters and no heating facilities are at hand to raise the temperature of the operating theater. Add to these inconveniences the effects of rain and mud and it is obvious that postoperative pneumonia should be prevalent in casualty clearing station surgery. It is, however, extremely rare, although mucus hypersecretion is the rule on account of the fact that so many of the soldiers have what is know as a Flanders cough. I cannot explain the infrequency of postoperative pneumonitis unless it is because the soldiers have become hardened by exposure.

Dr. E. M. Sanders, Nashville, Tenn.:—Oral prophylaxis is absolutely necessary in the preparation of patients for safe anesthesia and successful surgery. In our clinic we find about 90 per cent. of the patients coming to operation have pyorrhea, while some 25 per cent. have actually foul mouths. It is now our invariable custom to have the mouths of all such patients put into proper condition previous to operation and our incidence of postoperative pulmonary complications has materially decreased.

Dr. J. A. Zarrocki, Chicago, Ill.:—Six years intensive work in cleaning-up the mouths of patients with pyorrhea and abcessed teeth, enables me to verify and emphasize Dr. Sander's contention that oral propylaxis plays an important part in the prevention of postoperative pneumonitis. Microscopically foul mouths show the presence of staphylococci, streptococci and pneumococci and it is quite conceivable, how when they are churned out of pyorrhea pockets or abcess cavities and swallowed with the hypersecretion of mucus, an infection is set up.

Dr. Riley, Havana, Cuba:—While we have many cases of lobar pneumonia in Cuba, we do not have postoperative pneumonia. We use chloroform, of course, but our patients are not chilled nor is there hypersecretion of mucus.

Dr. Moses Salzer, Cincinnati, Ohio:—In connection with the role of ether as a factor in causing postoperative pneumonitis, it is of interest to note the fact that Dr. W. E. Savage is now using the closed method of etherization in the treatment of pulmonary and other form of tuberculous infections with surprisingly good results. Dr. Thad Reamy, the pioneer gynecologist of the Ohio Valley always taught that etherization was a specific cure for bronchial conditions.

CONDITIONS PERMITTING EVERY EFFORT WILL BE MADE TO HOLD THE REGULAR MEETINGS OF THE AMERICAN AND INTERSTATE ASSOCIATIONS OF ANESTHETISTS. IT IS HOPED THAT MANY OF THOSE NOW IN SERVICE WILL BE DEMOBILIZED IN TIME TO ATTEND AND TO PRESENT SOME OF THEIR INTERESTING AND VALUABLE OBSERVATIONS ON ANESTHESIA IN WAR SURGERY AND THEIR PERSONAL EXPERIENCES AT THE FRONT. UNDOUBTEDLY CONSIDERABLE DATA HAS BEEN DEVELOPED BEARING ON THE EFFICIENCY OF CERTAIN METHODS OF ANESTHESIA FOR EMERGENCY SURGERY THAT SHOULD BE OF IMPORTANCE TO CIVILIAN AS WELL AS WAR SURGERY.

NITROUS OXID-OXYGEN ANALGESIA IN NORMAL LABOR AND OPERATIVE OBSTETRICS.*

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EVANSTON, ILL.

In October, 1917, I reported in a paper which was published in the *American Journal of Obstetrics,* the results of the use of gas as an agent for the production of analgesia in a series of 476 cases. This series of cases covered the work which we had done with gas for this purpose from March, 1915, until the first of February, 1917. Since the termination of this series of cases, reference to the hospital records show that up to May first of this year we have used gas as an analgesia in 187 further cases, the sum of these figures giving us a series of 663 cases in which we have had the opportunity to observe the value of this method of relieving pain. The cases which make up this series comprise the private cases of members of the attending staff of the hospital; the cases of the ward service, and also those which were brought in from time to time by outside physicians.

The administration of gas in all cases was done by our permanent staff in the obstetrical division, hence a uniform technic was maintained, rendering all cases available for statistical study. Our technic is quite simple. The administration of gas is begun in primiparæ at or a little before the termination of the first stage. In multiparæ it is usually begun a little before the completion of the first stage. We try in so far as possible, not to administer gas for a longer period than three hours, as there appear to be theoretical objections for its longer use. In our earlier work we had a considerable number of cases which ran over a longer time than this without any untoward experience. However, the period of three hours covers in a great majority of cases the time of greatest suffering.

In cases in which a long and tedious first stage is anticipated, much relief may be obtained from the use of morphine hypodermically. The actual administration is carried out by one of the permanent staff of graduate nurses who has become familiar with the administration of analgesia, or by an interne who has had some experience with it.

The gas is begun immediately at the onset of a pain, if possible before the contraction becomes apparent to the patient as pain. The patient is asked to breathe deeply and quickly the number of breaths which are needed, varying in different cases. During the second stage if the obstetrician will keep a hand upon the sterile sheet covering the abdomen, he may often feel the beginning of the contraction before pain is apparent to the patient, and request the anesthetist to commence the administration of gas instantly. Failure to observe this rule of exceedingly early administration militates very seriously against success in gas analgesia.

I believe that slowness in beginning the administration of gas after the onset of pain is responsible for more failures to relieve suffering than any other one factor. Each patient is to some extent a law unto herself as to the exact amount of gas which may be needed. Some will obtain a very satisfactory degree of relief from pain with three or four breaths while others find it necessary to take more. We have found in some cases that it was necessary to give gas throughout the entire extent of the pain.

The percentage of gas varies somewhat in different patients. In some cases gas alone has been used, but the administration of nitrous-oxid unaccompanied by oxygen should be permitted only where a small number of breaths are necessary to produce analgesia. Oxygen may be added in percentages varying from 5 to 15, according to the individual necessities of different patients, but the average case does very satisfactorily with 5 to 7 per cent. The exact number of breaths to the percentage of oxygen must be determined by the operator shortly after the beginning of the administration of gas, and, having determined what is necessary for the relief of pain in the individual patient, one should continue to administer it in the same way. *Rebreathing is not permitted at any time while the child remains within the uterus.*

It is very necessary to distinguish between analgesia and anesthesia. Patients should not be permitted to pass beyond the zone of analgesia. Should this be permitted, we lose the coöperation of the patient and struggling becomes more likely than if it is not done. Cyanosis must absolutely be avoided and in the hands of a competent anesthetist may be prevented.

As the end of the second stage is approached, we permit a little more gas with each pain and at the time of delivery, for the last three to five pains, I have been for some time in the habit of adding a little ether through the gas machine. I find that this promotes relaxation, makes it more easy to control the head, and delivery may be accomplished without the patient being at all conscious of it.

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*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 10-11, 1918.

Episiotomy may be done at this time with the slight addition of ether without any appreciation of pain. Ether given in this way and for so short a time does not produce narcosis of any length and the patient rapidly awakes and only very rarely has any nausea.

As to the results which we have been able to attain by the technic just described, I will quote from the report which I have referred to above in the *American Journal of Obstetrics* in which in 476 cases, it was found that unsatisfactory results were attained in 7½ per cent. References to the history sheets in the 187 cases which we have had since the publishing of that report show that successful relief of pain is being attained in fully as high a percentage of cases at present.

We have so far not had a case of fetal death in which the death seemed fairly chargeable to gas. There has in every instance of still-birth been some other competent cause for the loss of the child. Of the 476 cases which I have already referred to, 32 babies were born asphyxiated to a greater or less degree. The histories of these cases show that in 12 of them some reason other than anesthesia existed which might be looked upon as responsible for the asphyxia. In 7 of these cases forceps operations had been done. One was a breech extraction, one threatened eclampsia and one child had a spina bifida and lived but three days. One case was a severe toxemia of pregnancy and one a premature labor. We have therefore 20 cases which may be looked upon as having shown more or less asphyxia.

Since beginning the use of gas we have not observed that hemorrhage of the new-born has increased in frequency. There have been a number of cases of hemorrhage of the new-born, but it is quite striking that some of the most serious of these have been cases which had received gas but a very short time. It should be remembered by the anesthetist, however, that asphyxia will cause hemolysis without regard to what may be the cause of the asphyxia, hence cyanosis must be avoided and, since its avoidance is largely dependent upon the development of a proper technic, there is little excuse for its occurring. It seems also to be a fact that anesthesia to the point of unconsciousness with any anesthetic may produce certain changes of cell structure and hemolysis may be looked upon as more likely, but with the proper gas technic, unconsciousness should not occur except at the end of labor and for a very short time.

When the use of gas as an agent for the production of analgesia was first begun there was a tendency by some to emphasize the point that its administration was exceedingly simple and to give the impression that it might be done by any one. As my experience with it has grown I have gone farther and farther from that point and at present am inclined to disagree with it absolutely. A properly given analgesia does require a certain amount of technic and it has been my experience that the advent of a new interne in the obstetrical division has usually been followed by a period of poorly given analgesias; since then we have tried to train each one of them somewhat in its use.

I have had no experience with the method of self-administration, that is, the permitting of the patient to start the flow of gas herself by means of a spring valve which she presses upon, and which closes should her finger become relaxed through too deep an influence of gas. I prefer much to have the administration of analgesia under the observation of a competent person.

After an experience of about three years with the opportunity of observing the use of gas analgesia in a number of cases referred to in this report, I feel that this method has given us the best results which we have yet been able to attain in our maternity.

The administration of gas does not diminish either the frequency of the uterine contractions nor the force of the individual contractions. In fact, as the pain of the second stage is so largely done away with, we find that our patients are much more willing to make use of their accessory muscles of expulsion and that the labor is hastened instead of retarded. The intelligent patient with a properly given analgesia will coöperate perfectly, bearing down when requested and stopping immediately if asked.

It has been a matter of frequent observation that a patient who has been complaining bitterly of suffering toward the end of the first stage, perhaps even becoming a little unmanageable, will almost immediately become quiet and amenable to suggestion upon the beginning of gas administration. I feel also that we have been able to carry a number of cases through a tedious second stage where by reason of the fact that the patient was a nervous individual and one who bore pain poorly, the labor might have had to be terminated by high forceps. I can recall several of these which have gone on to the point at which a simple low forceps operation sufficed. This of course has its effect upon the lowering of fetal mortality as well as sparing the mother the trauma of the high operation.

One other factor has impressed me greatly. That is, the relief from nervous exhaustion subsequent to labor by reason of the fact that the mother has passed through that portion of her labor which is accompanied by the greatest pain while under the influence of gas. I believe that the suffering which the patient undergoes is a greater cause for nervous exhaustion than the actual physical labor which she is called upon to perform. The second we cannot take away in a normal labor, but the first we can relieve, and its relief, I am sure, leaves the patient in a far better condition to enter upon her convalescence.

In the field of operative obstetrics, gas anesthesia finds a rather wide application. In that most common of all obstetrical operations, the primary repair of a perineal tear or of an episiotomy wound, gas is a most satisfactory agent when properly given, and in this provision, *"when properly given,"* we find the crux of the whole situation.

Surgical gas anesthesia is exceedingly safe and in a large percentage of operative cases, surgical and gynecological as well as obstetrical, a very satisfactory anesthesia when given by one who has been properly trained in its use. It is neither safe nor satisfactory when administered by one who has not been properly trained. This opinion has been expressed before by those who have had occasion to acquire some experience with it in operative work and after a considerable experience with gas anesthesia in abdominal, pelvic and vaginal work, I wish not only to agree with that opinion but to emphasize it.

I do not permit upon my service that any general anesthetic for operative work shall be given with gas for either a gynecological or obstetric patient except by the hospital anesthetist. Where it is necessary that the services of an interne be used, ether is always chosen.

A primary perineal repair is a surgical operation and requires that the patient should be relaxed and quiet upon the table. The patient who is but partly asleep and struggling interferes with asepsis and renders impossible a proper carrying out of even a simple surgical procedure. But as the child is now no longer in the uterus, rebreathing is no longer objectionable and the patient may be anesthetized, exactly as though she were to have any other operative procedure, and should it be necessary, a little ether may be added.

In the giving of surgical anesthesia in this as in all other operations, our aim should be not stubbornly to limit ourselves to one agent for the production of anesthesia, but to produce in the patient safely that degree of narcosis which is necessary for the proper carrying out of the procedure in hand. My repair operations, unless the injury be a quite extensive one, are usually done immediately after delivery and before the expulsion of the placenta. A gas-oxygen anesthetic for this purpose has not, in my experience, delayed the expulsion of the placenta except in those cases in which considerable ether is used, and these cases are but very few.

My attitude, however, toward the use of nitrous-oxid anesthesia in forceps operations is somewhat different. As I have mentioned above, I object to the use of rebreathing in an obstetric case prior to delivery on account of the fear of overcarbonization of the fetal blood. Without rebreathing it is difficult to secure that degree of relaxation which is necessary for the proper carrying out of even a low forceps operation. I have tried this faithfully many times and have had the anesthetic given by careful and competent anesthetists but with the exception of a few cases had poor results.

I have also tried repeatedly the use of gas oxygen without rebreathing with the addition of ether, but have almost invariably found that the amount of ether required was so great that there was but little advantage over a straight ether anesthetic. After faithfully trying out gas anesthetics for forceps operations over a considerable period of time I have now gone back to straight ether in these cases. I believe that the objections to ether in forceps operations are to be considered much less than the danger of disturbance of asepsis by the sometimes violent movements of the mother under an incomplete narcosis.

For the simple operation of induction of labor by the introduction of the hydrostatic bag, gas oxygen provides us with an ideal anesthetic. Complete relaxation is ordinarily not needed, hence extensive rebreathing is not necessary. However, should rebreathing to a moderate degree be required, inasmuch as delivery is still far off, it may be used, as any carbonization of fetal blood is done away with during the succeeding hours of labor, and, should one fear it greatly, the mother may be given a little oxygen at the termination of the anesthetic. These anesthetics are ordinarily short and gas permits the bag to be introduced without pain and allows the mother to wake up without nausea usually and without the deadening effect upon the uterine contractions which ether produces, when one is desirous that they should be immediately begun.

In case the introduction of more than one bag in the same case is requisite, anesthesia may be repeated, and after dilatation is complete these cases receive analgesia during the second stage, exactly as I have described.

For evacuation of the uterus in cases of incomplete abortion or for the introduction of packing in cases of inevitable or therapeutic abortion, gas is equally desirable. In the hands of a competent anesthetist sufficient relaxation may almost invariably be obtained without the addition of ether and in these cases rebreathing may be used if needed. Cases of this character I have done with gas anesthesia for some years prior to the time we began to use it in obstetric work and in the past five years have used ether in cases of this sort probably not more than a half dozen times.

In Cesarian section I have had no experience with the use of gas, as I have always done these cases under ether. I have feared the effect of rebreathing upon the fetus and have not felt that sufficient relaxation could be gotten without rebreathing to make the procedure wholly safe. I feel also that the preliminary dose of morphin and scopolamin an hour prior to operation, which renders the giving of surgical anesthesia by gas oxygen much more easy, is objectionable upon obstetric grounds, inasmuch as delivery will occur in too short a time subsequent to the giving of these drugs. That morphin or scopolamin should not be given when delivery seems likely to occur in less than three hours is an obstetric rule, the validity of which is conceded even by the protagonists of the so-called *twilight sleep*. I intend, however, as soon as the opportunity presents in a nephritic case, doing this operation under local anesthesia with the possible addition of some gas, but with no preliminary administrations of narcotics.

CONCLUSIONS.

1. Gas furnishes an ideal method of relief of pain in normal labor, the safety of which, in competent hands, has been demonstrated by a large number of cases.

2. For all of the minor operative procedures in obstetrics and gynecology, such as primary perineal repairs, evacuation of the uterus, introduction of bag or gauze, gas supplies an efficient mode of narcosis which is free from most of the objections of ether.

3. For all operative procedures which are done before the delivery of the child, rebreathing should not be used.

4. In complete anesthesia in obstetric work as in complete anesthesia in surgery and gynecology, gas should always be administered by some one properly trained in its use and the fact that gas is highly safe in competent hands must not distract our attention from its dangers in untrained hands.

5. It is best to limit analgesia to a period of three hours.

1620 HINMAN AVENUE.

DISCUSSION.

DR. BEN MORGAN, Chicago, Ill.:—After a more limited experience of some 250 cases of gas-oxygen obstetrical analgesia, I agree with the efficiency of the technic Dr. Danforth has recommended. Aided by an expert anesthetist the obstetrician can be saved several useless hours of attendance, meanwhile remembering that delivery under gas-oxygen is more rapid than under other circumstances. The essential principle of success is anticipating the uterine contraction with the administration of the analgesic. The number of inhalations necessary to secure a proper depth and duration of analgesia depends on the volume of the patient inspiration and her breath-holding capacity. From three to six breaths of the gas-oxygen usually suffice. Rebreathing is not so dangerous as supposed, if properly handled and it may be necessary and desirable in controlling exaggerated pain, while occasionally it is necessary for conserving the supply of gases on hand. Of course it should never be used to the point of anoxemia. I have found concomitant etherization of value or ether-air a good substitute for the operative phases of obstetrics after gas-oxygen has supplied all requirements for the analgesic period of labor.

In Cesarean section the anesthesia is a major one and must be handled by an entirely competent anesthetist. It is not necessary to push gas-oxygen anesthesia to the point of relaxation as the abdomen of the pregnant woman is sufficient relaxed by admit of any manipulations necessitated by Cesarean section. The injection of pituitrin recommended by Dr. Webster I have also found efficacious not only obstetrically but also in stabilizing the circulation. It is not unusual in Cesarean section under gas-oxygen with pituitrin to put the mother back to bed without a variation in the pulse-rate.

DR. E. I. MCKESSON, Toledo, Ohio:—Patients can and should be trained to accept and manipulate analgesia. If permitted to experience the difference between normal labor pains and the obtunding effect of gas-oxygen, the mother's cooperation can usually be rapidly secured. It is necessary to have the breathing adapted to the requirements of the analgesia. Deep breathing and holding of the last inhalation accomplish a great deal in making analgesia satisfactory. There is no reason for cyanosis occurring even with some rebreathing. In some cases, of course, cyanosis will persist, irrespective of rebreathing or oxygenation, and in such cases cardiac incompetence is usually present. I have found gas-oxygen anesthesia entirely satisfactory for Cesarean sections, but profound anesthesia must not be used as it is harmful to both the mother and the child. The mother may be rendered cyanotic, the child anoxemic and the uterus may be paralyzed. Section should be done under light anesthesia, and immediately after incision of the abdomen pure oxygen should be given for two or three breaths. This assures enough oxygen to the child. When the child is delivered the anesthesia is resumed for whatever remains to be done. I have not found it necessary to use concomitant etherization with gas-oxygen for forceps deliveries. Viable children usually breathe promptly after the air-skin reflex despite the use of gas-oxygen analgesia or anesthesia. It is remarkable how some hysterical women will continue their complaints under analgesia, but will travel across continents to have the benefit of gas-oxygen in subsequent deliveries.

DR. ORVAL J. CUNNINGHAM, Kansas City, Mo.:—I have found the self-administration method of obstetric analgesia very satisfactory with gas-oxygen. Patients can anticipate the uterine contraction somewhat earlier than can the obstetrician or anesthetist and by beginning the inhalation of the gas-oxygen more promptly will accomplish a better analgesia. The self-administration method can be continued until the patients want to pull down, at which time the anesthetist takes over the conduct of the analgesia. Gas-oxygen anesthesia is not only indicated for Cesarean section but especially in the presence of eclampsia. Pituitrin should be used with due caution. I have seen one instance of acute cardiac dilatation follow the administration of two doses of ½cc. twenty minutes apart.

Dr. Danforth, (Closing):—I have nothing especial to add, except perhaps that obstetrical analgesia is something that can and should occupy the entire time of the person administering it. In the future, in view of the encouraging reports I have just heard, I shall use gas-oxygen anesthesia for Cesarean sections.

THE INFLUENCE OF CHLOROFORM ON THE STABILITY OF THE RED BLOOD CORPUSCLES.*

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Woolridge, by a chemical analysis of the composition of the red blood corpuscles, determined that about 30 per cent of the dry remnants of the stroma consists of so-called lypoid substances, chiefly lecithin and cholesterin. These findings were subsequently corroborated by Pascucci and others. Since both, lecithin and cholesterin, are to a very considerable extent soluble in chloroform, the chemical composition of the red blood corpuscles alone admits of the supposition that chloroform anesthesia is capable of influencing their stability in some way or other.

This supposition is corroborated by the fact that chloroform *in vitro* possesses the qualities of a strong hemolytic poison causing diffusion of the coloring substances (Bottcher, Hermann and others). This is likewise supported by the investigations of Pohl, who determined that the greatest part of chloroform in the blood circulation in chloroform anesthesia is retained by the red blood corpuscles; the latter, according to this author, being capable of retaining approximately four times more chloroform than plasma.

It is necessary, however, to take into consideration that during anesthesia the amount of chloroform in the blood is relatively small, being, according to Pohl, about 0.035 per cent of the entire amount of blood; and that chloroform is very quickly excreted from the organism. There are reasons to believe that within 30 to 50 minutes after anesthesia, a considerable part of the chloroform has left the body, chiefly through the lungs and somewhat less through the skin and kidneys (Lallemand, Duroy, Perrin, Fubini and Pohl).

The question as to the nature of the union between chloroform and the lipoids of the blood corpscles still remains open. The union is apparently not a stable one, as the absorbed chloroform easily separates when a layer of air is passed through the mass of blood. We must admit that in all probability we deal here with a simple process of absorption. It is apparent that the great importance of chloroform anesthesia in modern clinical surgery, together with the investigations of its influence upon the other organs and tissues, attracted the attention of investigators to its influence on the blood, as chloroform penetrates it first and by its aid is distributed to all other parts of the organism, particularly to the central nervous system.

We will limit ourselves to a very brief review of the investigations so far made for determining the influence of chloroform upon the stability of the red blood corpuscles. All these investigations have been of a laboratory character up to the present time. The method consisted chiefly of taking a specimen of blood from an animal and passing through it a mixture of chloroform vapor and various quantities of air. We have already mentioned that Bottcher and later Hermann have used this method for the purpose of determining the hemolytic properties of chloroform. It is conclusively proven that the diffusion of the coloring matter results from the injury to the lipoid components of the red corpuscles. Some of these proofs were given by Pariscot and Heully. *They proved that the time during which chloroform vapor is passed through the blood is a greater factor in the degree of hemolysis; the process of hemolysis being by far more extensive if even very small quanties of vapor are used for a longer time, than large quantities for a shorter period.* According to some authors the hemolytic properties of ether are very much weaker than those of chloroform.

All the investigations along this line show a certain onesidedness; in determining the influence of chloroform upon the stability of the red blood corpuscles, the standard of comparison was exclusively a hypotonic solution of sodium chlorid. But, according to our present knowledge, the osmotic stability can under no circumstances be considered as a full reflection of all those defensive powers which the red blood corpuscles exhibit when acted upon by various hemolytic agents. The methods or processes by which various hemotoxins injure the red blood corpuscles are far from being identical. This is due to the highly complex physico-chemical composition of the red blood corpuscles on one side, and to chemical and physical differences of various kinds of blood poisons on the other.

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*Researches from the Therapeutic Clinic of Prof. B. P. Obraschov of the St. Vladimir University, Kiev, Russia

* Read during the Fourth Annual Meeting of the Inter-State Association of Anesthetists, in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., Sept. 25-27, 1918.

The hemolytic action of the anisotropic solution of sodium chlorid is based upon the destruction of the osmotic equilibrium within and without the red blood corpuscle, *i.e.*, the solution of the hemoglobin is due to a purely physical force. But in hemolysis caused by chloroform and other substances by destruction of the lipoid substances of the red blood corpuscle, the chemical and physical processes differ entirely from those observed in the sase of a simple destruction of osmotic equilibrium.

Evidently of the greatest interest is the answer to the question: How does chloroform affect those qualities of the red cells which are inherent to the corpuscles because of their lipoid substances? This interest is still greater because the group of hemotoxins, the mechanism of whose activities depends upon the action of the lipoid substances, is very large and variegated; to this group belong, besides chloroform, ether, acetone and fatty acids, also a long list of hemolytic poisons of vegetable origin, such as glucosides, saponins, sapotoxins, digitoxins, toxoalbumins, ricin, crotin and others. To this same group of lipoid hemotoxins may be added some bacterial toxins: strepto- and staphylolysin and tetanolysin.

The solution of this question can be reached by determining how the stability of the corpuscles is modified toward hemolysins by chloroform anesthesia. For this purpose we determined in our investigations the stability of the corpuscles towards hemolysins before and after anesthesia. Since we were investigating only chloroform anesthesia, we primarily directed our attention to chloroform. It was natural to presuppose that chloroform could more distinctly render the antichloroforming stability. As an additional investigation we also, in each case, determined the stability of the red blood corpuscles toward hypotonic solutions of sodium chlorid. It is plain that such a method of investigation affords an opportunity of observing also such results of the narcotic action, which, when determining only the antiosmotic stability, remained unnoticed. This particularly refers to the conditions of clinical chloroform anesthesia. In experimental chloroform anesthesia, either *in vivo* or *in vitro*, augmenting the action of chloroform, one can, of course, reach those degrees of injury to the lipoid substances of the red blood corpuscles, which show themselves by determining the osmotic resistance. But clinical anesthesia, for very evident reasons, is always limited as to the amount of chloroform. Thus, we figured to disclose by the aid of the above mentioned method, those modifications of the red blood corpuscles, which are caused by chloroform through the process of ordinary clinical chloroform anesthesia.

Blood for investigating purposes was taken by the aid of a syringe from one of the veins of the bend of the elbow. This was done at least twice: once during the day of operation one to three hours before the beginning of anesthesia and once 30 to 50 minutes after the termination of anesthesia. Since the technical details of determining the antiosmotic and antisaponic stability were described by us in one of our previous monographs, we will here limit ourselves to only a few explanatory remarks.

The antiosmotic stability of the red corpuscles was determined as follows: In a series of centrifugal test tubes (narrowed at the bottom), containing solutions of a gradually lowered strength of sodium chlorid, there was dropped fresh blood from the vein (two drops in each test tube). The difference of the strength of sodium chlorid solution in the adjacent test tubes was 0.03 per cent. The tubes were carefully shaken till the contents were of a uniform consistency. The measurement of antiosmotic stability was that strength of hypotonic solution in which after a definite period of time hemolysis took place. For the purpose of determining the antisaponin stability we used a series of similar test tubes of an increasing strength of a saponin solution (Saponinum albissimum—*Merck*) in 0.6 per cent. salt solution. The degree of solution of saponin was exactly established. For each cycle of observations upon the same patient, we used the same saponin solutions. Since both determinations were made the same day, we were fully insured that the glucoside solutions did not lose any of their hemolytic qualities. The antisaponin stability of the red blood corpuscles was measured by the degrees of strength of the corresponding saponin solution. Exactly the same principal is at the bottom of determining the antiacetone stability. The antichloroform stability we defined by the following method: We started with a saturated solution of chloroform in a 0.6 per cent. solution of sodium chlorid. In each subsequent test tube there were two more drops of chloroform. Because of the possible evaporation of chloroform as well as acetone, the solutions were made in an exactly constant and similar order previous to getting the blood from the vein. As a measurement of antichloroform stability of the red blood corpuscles we used the strength of chloroform of that test tube in which there was complete hemolysis. The test tubes with the added blood were always kept for four hours at room temperature. For the purpose of pouring the solutions we used droppers, which insured the uniformity of the drops. The same kind of droppers were used for various solutions. The droppers, immediately after use, were thoroughly washed with water, alcohol and ether and dried by the aid of air. Likewise the test tubes were always used dry. Our observations were performed upon the material of the surgical clinic, both ambulatory and hospital.

In a series of 18 cases of major surgery, in patients between the ages of 13 to 67 years, lasting from 25 minutes to 2 hours and 5 minutes, it was noticed that in the majority of cases, chloroform, in a total dosage of from 8 to 52 gms., lowered, in a more or less constant degree the antichloroform stability of the red blood corpuscles, although a few cases showed no appreciable effect. It is difficult to form a definite relation between the amount of chloroform used during the operation and the degree of lowered antichloroform stability of the corpuscles. Evidently the minimum and maximum stability are to a certain extent independent, as in some cases one or the other stabilities was lowered, or when both decreased one was more affected than the other. Generally speaking a noticeable lowering of the maximum and minimum antichloroform stabilities followed the use of larger amounts of chloroform, or repetition of anesthesia for a secondary operation, associated with emaciation and poor contion of the patient. Individual peculiarities of the antichloroform stability may also have some relation to the amount and distribution of the lipoids of the corpuscles and the serum.

Chloroform anesthesia does not seem to have any noticeable influence on the antiosmosis stability of the red blood corpuscles. Out of 18 cases observed, the antiosmosis stability was not changed in 16. The antisaponin and antiacetone stabilities remain the same in most cases, although occasional lowering is noted both as to the maximum and minimum.

To determine the actual influence of chloroform anesthesia as the factor in changing stabilities, the stability of red blood corpuscles were also determined under local anesthesia. In four cases the method of determination was that already explained. In other cases the stability of the red cells, previously washed in a 0.6 per cent. solution of sodium chlorid, 3 times within one hour and centrifuged and then made into a 33 per cent. solution (by weight) in 0.6 solution of sodium chlorid, 6 drops to each test tube, was thus determined.

In none of the cases operated on under local anesthesia was any lowering of the stabilities noticeable, either for the whole blood or the washed cells. These investigations corroborate the view that chloroform anesthesia itself, and not the operative procedure, directly effects the stabilities of the red blood corpuscles.

In the researches as conducted a certain amount of chloroform remained in the blood system 40 to 50 minutes after operation when the tests were made. The question, therefore, arose: "Whether this insignificant addition to the strength of the chloroform solution in the test tubes accounted for the results obtained?" To solve this problem the red blood corpuscles were washed in a 0.5 per cent. solution of sodium chlorid before as well as after operation. The washing was done by centrifuge for a period of one hour and fresh saline solution was added four times. A 33 per cent. solution of washed cells was made with a 0.6 per cent. saline solution and 6 drops used for each test tube. It was found that the antichloroform stability of the corpuscles was lowered even when washed, proving conclusively that the lipoid substances of the corpuscles are actually injured by the chloroform and that the insignificant amount remaining in the blood was not the determining factor.

The next question to be solved was: "How long does the lowered stability of the corpuscles last and to what extent can the stability be restored?" Our researches indicate that the antichloroform, antiacetone and antiosmosis stabilities of the red blood corpuscles remain unchanged in the same case for a period of 24 hours, provided, of course, that during this period nothing further occurred that would tend to lower these stabilities. This observation also holds good for secondary operations.

The first stability to be restored is the minimum. This occurs in from 16 to 18 hours; in 24 to 26 hours the maximum stability is also restored.

In concluding the results of our work we will cite observations on the influence of chloroform anesthesia on the stability of red blood corpuscles *in vitro*.

Four cc. of freshly obtained blood was poured in each of two test tubes (A and B). The corpuscles were washed for an hour by the aid of an electric centrifuge and salt solution was added three times. After the third addition of salt solution, it was decanted and into the test tube A 5 to 6 cc. of the same salt solution was added and into the test tube B was added a similar amount of the same salt solution containing a saturated solution of chloroform.

We discovered that such addition of chloroform did not cause hemolysis. In order to find out whether the red blood corpuscles actually remain unchanged as to the antichloroform stability or not, the following experiment was performed:

Both test tubes with their contents (A, salt solution and B, chloroform solution) were corked with cotton and put in the incubator for one hour at a temperature of 38 degrees Centigrade. Then the contents of the test tubes were centrifuged, decanted and the corpuscles washed for one hour with salt solution added to each test tube three times. From the washed red corpuscles of each tube, we made 33 per cent. solutions (by weight) in a 6 per cent. solution of sodium chlorid and added 6 drops to each tube (these drops were taken from test tubes A and B).

The results of these investigations of the chloroform action upon the corpuscles approximate very much the results obtained under clinical circumstances.

CONCLUSIONS

We briefly repeat the results of our investigations: Chloroform anesthesia lowers the stability of the red blood corpuscles; the antisaponin and antiacetone stabilities are not so often affected, and, finally, the antiosmosis stability after chloroform anesthesia is rarely comparatively lowered.

Also, our investigations corroborate the specificity of the different methods of hemolysis. Chloroform, injuring the lipoid substances of the red elements of the blood, must, of course, show its destructive action much more so when these substances of the blood had already been acted upon by previous narcosis. But the lipoids are acted upon, although in a different manner, by other substances, such as saponin and acetone; the first enters with cholesterin and lecithin into a permanent chemical union; and acetone, in solutions that cause hemolysis, besides its action upon the lipoids causes coagulation of the albuminous bodies (*Koppe*).

At any rate, the process of chloroform anesthesia, causing a more or less noticeable destruction of the lipoid substances of the red blood corpuscles, may cause a lowered stability also with regard to these hemotoxins. The mechanism of the hemolytic action of hypotonic salt solutions, however, is not connected with the state of the lipoid substances of the corpuscles; this is why injury to the lipoids caused by chloroform anesthesia seldom lowers the antiosmosis stability.

In conclusion, we wish to offer our thanks to Professor H. M. Volkovitch for his kind permission to use the material from his clinic, and also to all those connected with the surgical clinic for their friendly co-operation during the performance of these experiments.

410 ARMORY AVENUE.

BLOOD-PRESSURE AS A GUIDE DURING MAJOR OPERATIONS.*

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It is a well-recognized surgical principle that whatever measures may avail to safeguard the patient before, during, and after operation, should be taken. In a previous communication we have pointed out the necessity for most careful study of our patients' vitality and physical idosyncrasies before bringing them to the table, as well as the need of painstaking watchfulness throughout their convalescence. But while these measures are most highly desirable, and to neglect them is inexcusable, we should go still further, especially in capital surgical procedures, and keep ourselves informed throughout the operation as to the exact condition of the patient. Such information it is perfectly easy to obtain through frequent readings of the blood-pressure. These may be taken by the anesthetist without in any way interfering with his other work, and the information which he from time to time imparts is of great value to the operator. When all is going well, it is a distinct comfort to know it, and, on the contrary, if the patient's condition begins to decline, the operator is forewarned of impending disaster, and may take proper steps to combat it.

With a view to determining the value of blood-pressure as an index during operations, we have studied a series of 50 cases, deliberately selecting operations of the distinctly major type, with enough simple ones to act as controls. The extensive pelvic dissections incidental to the radical Wertheim operation for cancer of the uterus, and the trying operations in and about the mouth and neck for the same disease as performed by Dr. Farrar Cobb at the Massachusetts General Hospital, offered unusual and extreme opportunity for our study. Such operations, of course, place a tremendous tax on a patient's vital forces, and whatever changes may take place in major work are most likely to appear in this class of cases.

Plan of Study:—For comparison with each patient's pressure during operation, we noted his pressure at the time of entrance to the hospital, taken as a matter of routine in the physical examination. With this as a starting point, the pro-

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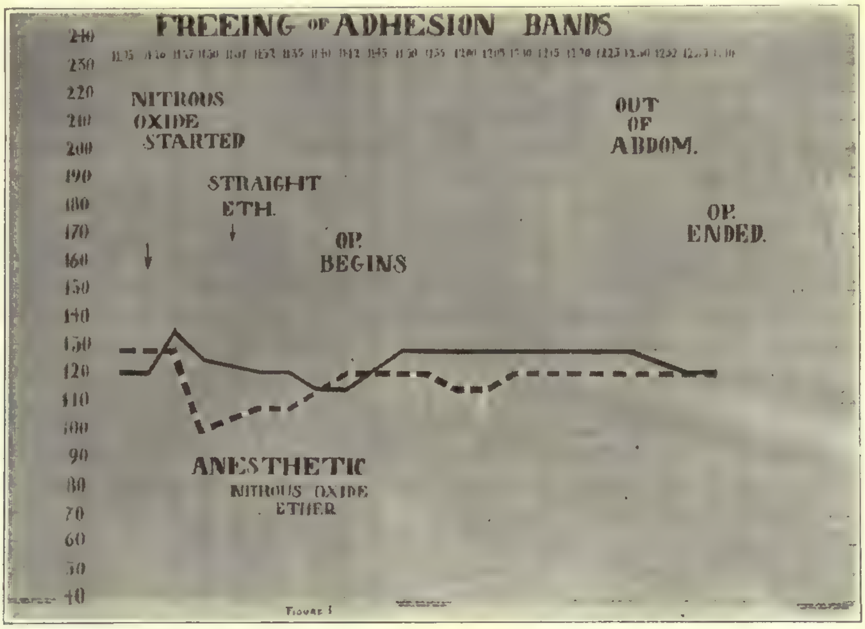

Chart I—Note initial rise of blood-pressure almost synchronous with beginning of nitrous oxid, which soon fell again to the *individual level,* remaining there throughout the operation. This chart is characteristic of the controls.

cedure was as follows: The systolic pressure and the pulse rate were noted when the patient reached the etherizing room and before anesthesia was started, again at the time it was started, and at least once every five minutes throughout the operation. In many instances, or whenever there was taking place an obvious change in the readings, we recorded that change as often as once in two or three minutes. In addition, there was noted the time the operation was started, any change in the patient's position on the table, any specific steps, such as ligation of important vessels, anything likely to produce sudden reaction, or any event of special interest.

A Tycos sphygmomanometer was employed, and in the abdominal operations the patient's arm was carried above the head; in operations about the head and neck, where the arm lay at the side, the length of the tubing running from the cuff was increased by using glass connecting tubes between this tubing and other pieces of similar diameter about a foot long. In this way it was easy to get

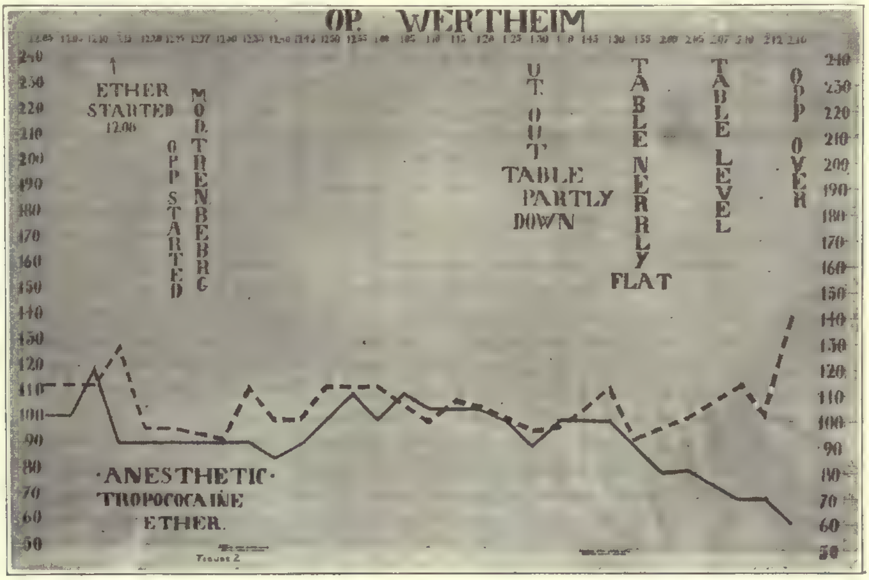

Chart II.—Illustrating the drop in pressure to a point below the *individual level* after the initial anesthetic rise. This phenomenon, followed by the rebound to the patient's level, is nearly constant.

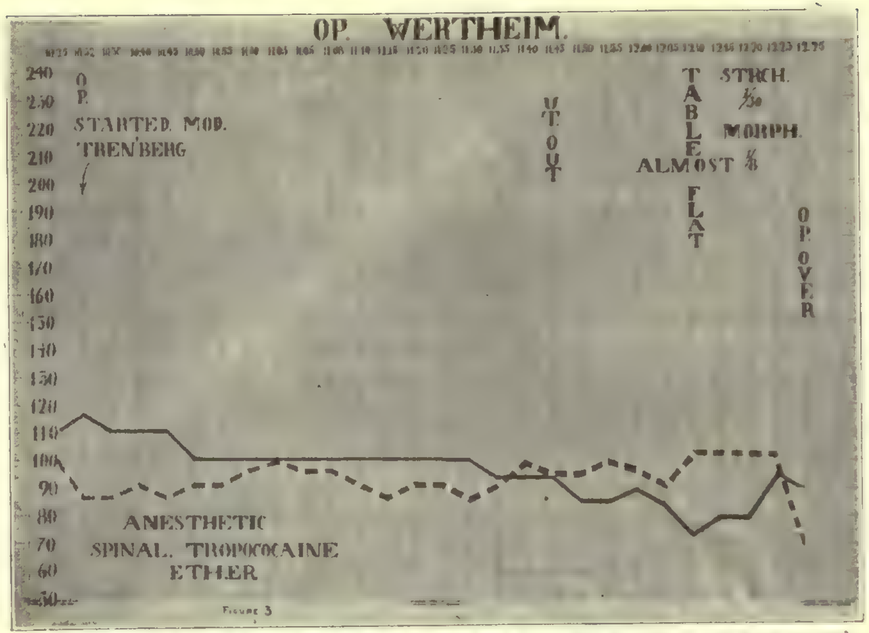

Chart III.—In this case, at 11:30 a. m., an hour after the operation had been started, there began a gradual fall of pressure, indicative of failure. The alteration was unaccompanied by appreciable change in the pulse rate. The upward rise at 12:10 p. m. was in all probability due to the fact that no more traumatizing work was going on in the pelvis.

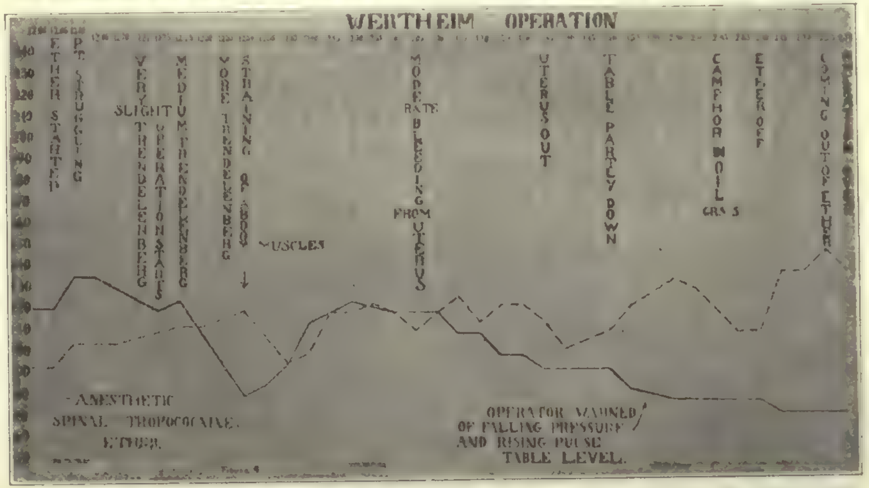

Chart IV.—Moderate shock, with gradual fall in pressure and rise in pulse rate. Observe that the pressure fall began from a quarter to half an hour before the pulse rate appreciably increased. The sudden drop at 12:25 p. m. was very likely due to the increased Trendelenburg position and to the **muscular straining.**

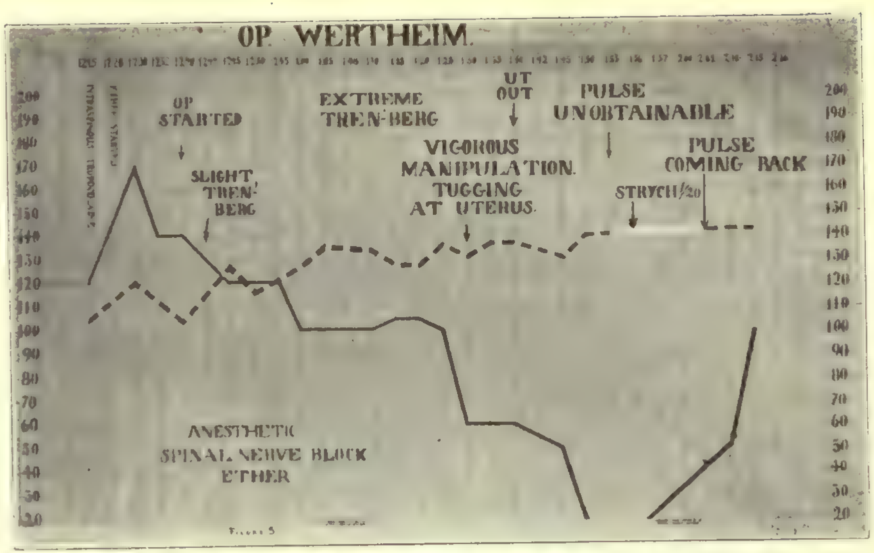

Chart V.—Typical chart of shock, in which the fall in pressure and rise in rate were practically simultaneous. The sudden drop at 1:30 p. m. is illustrative of what manipulation of the pelvic and abdominal organs may produce in pressure changes.

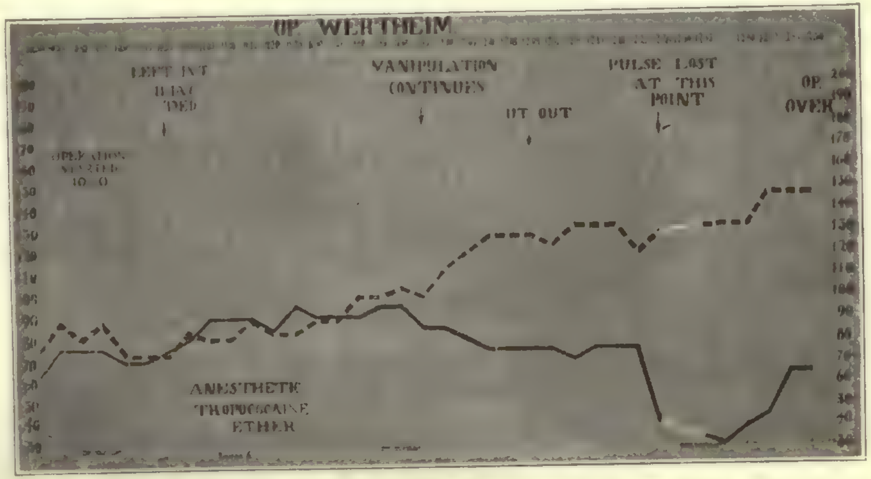

Chart VI.—Characteristic shock chart. An initial fall, as illustrated here, following the intraspinal injection of tropacocaine, was not uncommon. During the first hour the pressure rose from a low point at the start to a higher level. From 11:30 to 11:50 a. m. the operator was freeing the parametrium from pelvic walls, the procedure requiring a good deal of manipulation. This undoubtedly was what induced the shock. This patient responded very quickly to stimulation after being put to bed.

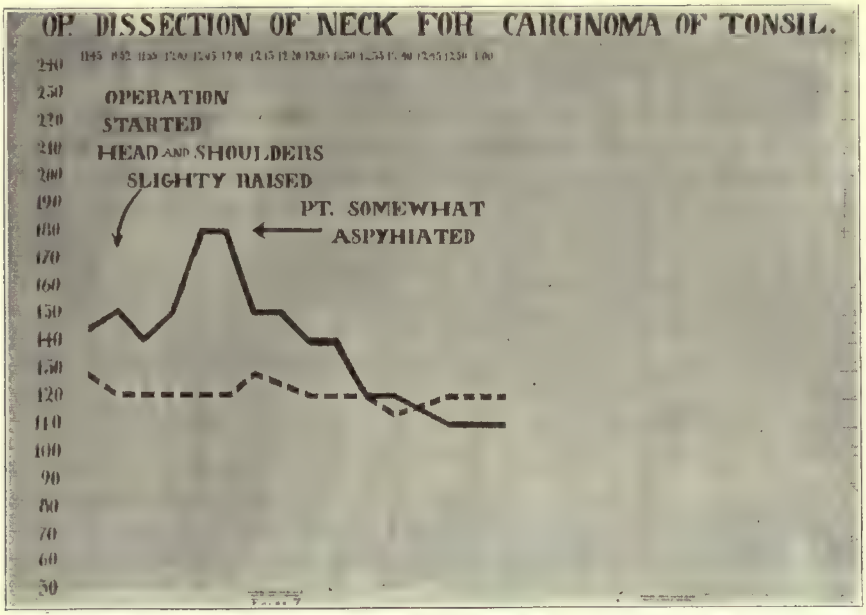

Chart VII.—At 12:00 m. the first upward rise was noted. During the next five minutes it went from 150 to 180. At this point the interference with respiration was eliminated and the pressure immediately dropped. The continued fall was probably a forerunner of shock.

the pressure at all times without interfering with the operator.

In making these observations there are several opportunities for error, which must be guarded against. First, it is essential that the measurement be taken at the same level as the heart, for if made at a point lower than the heart we obtain not only the blood-pressure, but the weight of the column of blood representing the difference between the level of the heart and the level of the observation, and, bearing in mind that a column of blood 10 cm. high gives a reading of 8.5 mm., the necessity for care is obvious; and conversely, if the point of reading be above the heart, a corresponding error in the negative direction occurs, so that we do not get the full pressure value. Second, the cuff sometimes slips on the arm, even to below the elbow. It must be firmly adjusted; otherwise the reading may be from 20 to 30 mm. too high. Third, the air may be partially or completely shut off, either

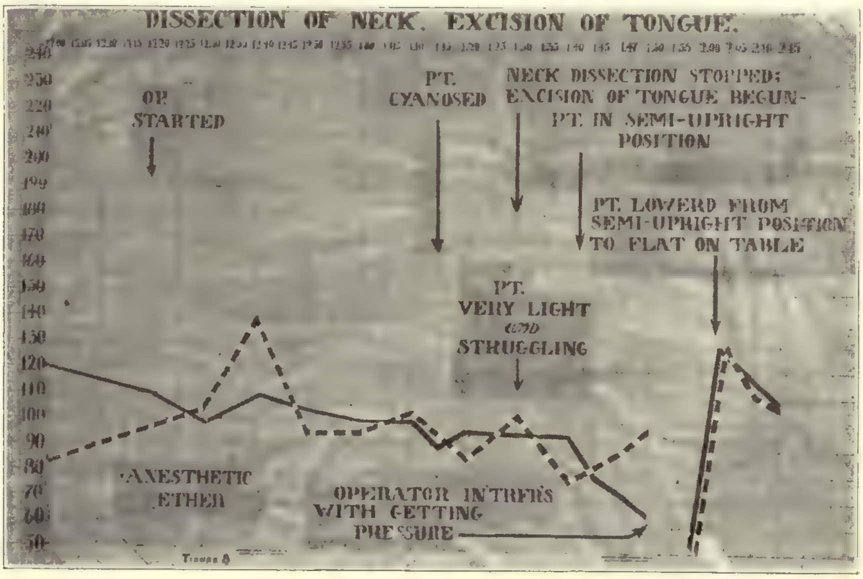

Chart VIII.—Phenomenon of cerebral anemia. Note the instant drop in pressure at 1:40 p. m. when patient was put in semiupright position; also the continued and rapid fall in both pressure and pulse until table was again in a horizontal plane. Then observe the instant rebound to point above the *individual level* and immediate subsidence toward subanesthetic line.

by a kink in the tubing or by the operator leaning against it, both easily overlooked, since the tubing is covered by the sheet. Fourth, the radial artery should not be on a stretch by extension of the hand, as thus the pulse beat is more quickly obliterated. Flexion of the wrist, as we observed it, gives between 5 and 10 more degrees in the reading. Fifth, it is always well to allow 10 degrees of pressure as the limit of error, as constant compression of the patient's pulse may cause vasomotor paralysis in the recorder's finger tips.

In no instance was the difference in the *individual levels*—the term we have applied to the patient's normal waking rate—as taken when the patients entered the hospital and when they reached the etherizing room, great enough seriously to regard. Their readings were, as a rule, slightly greater when they came to the operating floor than at the time of the initial physical examination. This was due, no doubt, to fear or excitement.

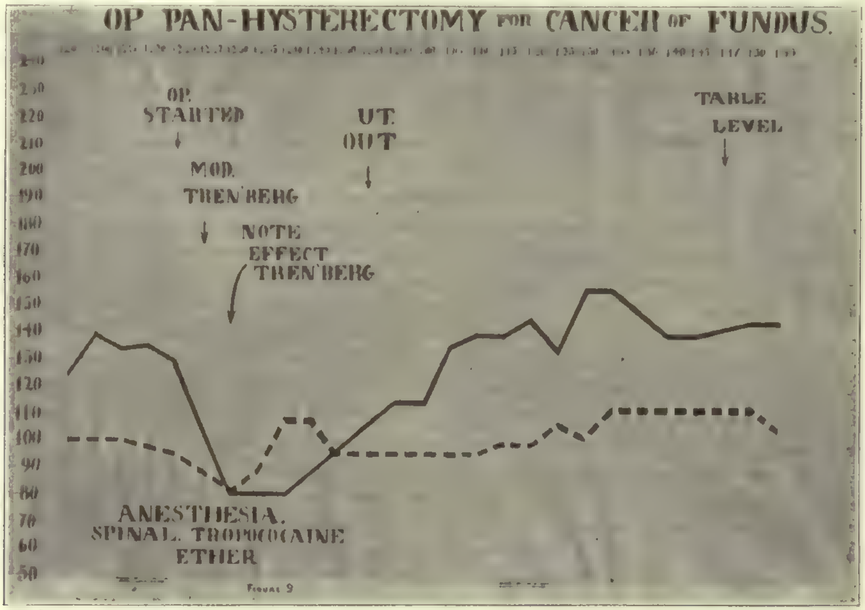

Chart IX.—Effect of Trendelenburg position (see also Charts II, IV, V, X. Chart II illustrates that occasionally there may be no change whatever). In all these cases of Trendelenburg position it is not unlikely that the fall may have been due to manipulation of the pelvic viscera, or possibly to the gravitation of the tropacocain to the higher nerve centers.

As a general rule, immediately after the start of anesthesia there is a rise of from 10 to 30 degrees in the pressure, but after a few minutes it again falls to somewhere near the patient's *individual level.* This phenomenon is seen in both ether and in nitrous oxid anesthesia, and it appeared also in four cases anesthetized by rectal anesthesia. The rise is due, undoubtedly, to the sudden introduction into the blood of a foreign gas, which instantly acts upon the vasomotor center in the medulla, raising the pressure. The *individual level,* after being reached, is maintained rather closely throughout anesthesia, barring changes due to oncoming shock, asphyxia, sudden cerebral anemia, or changes in the patient's position on the table. Certain other factors, such as struggling, depth of anesthesia, and manipulation of organs, also influence the pressure, but to a less degree.

Shock:—In several cases of shock of varying degree, there was, as a rule, a gradual fall in the pressure, as shown by the readings, starting from twenty to thirty minutes before there appeared an appreciable rise in the pulse rate. This fall was too slight to detect without a recording apparatus, but was gradual in the succeeding readings, showing a progressive fall of from 5 to 10 degrees. This made it possible to notify the operator of the patient's failing condition a considerable time before there was noticeable change in the quality or rate of the pulse, signs on which it is ordinarily the custom to depend for warning of imminent failure or shock; and by acting early in these cases, conditions which easily might have become serious were rendered harmless. The rule that the pressure falls first does not, however, invariably hold true, for in some instances the beginning drop in pressure and the rise in pulse rate were virtually simultaneous.

Asphyxia:—Janeway has pointed out that in first-stage asphyxia, during which the respiratory center is stimulated and the breathing is rapid and deep, the vasomotor center in the medulla is also thrown into action, and a marked rise in the blood-pressure occurs. This is also seen in slighter grades of deficient oxygenation of the blood. Janeway applies this observation more especially to the study of cardiac and lung conditions and to laryngeal diphtheria.

This phenomenon occurred in two cases of the series, both in operations about the face. In each instance it was possible to warn the operator, even before there had taken place the usual darkening of the blood, that the patient was getting an insufficient supply of air. As the difficulty in these cases is usually due to the operative procedures, rather than to the anesthetic, the warning to the surgeon is of real value. Chart VII vividly represents the pressure change which comes with interference in breathing.

Cerebral Anemia:—In cerebral anemia the pressure phenomenon is exactly the reverse of what is seen in asphyxia. In each of the three operations in which it was observed,—all of them for cancer about the mouth,—the patients were, at the time of the occurrence, in the reversed Trendelenburg position. The fall in pressure was invariably almost instant, very alarming, and accompanied by marked slowing of the pulse. Immediately on change of position to the level, or slight Trendelenburg, the pulse and pressure righted themselves with a bound, going at first to an excess of the rate they had maintained up to this time, then quickly subsiding to the normal subanesthetic point for the individual.

Trendelenburg Position:—It has been said that the effect of the Trendelenburg position is unfavorable to patients, and, with a view definitely to determine whether this was so, we carefully observed the result of placing individuals in this unnatural posture. In nearly every instance there was an almost immediate fall in pressure, to a greater or less degree, though, as a rule, the downward curve was not an alarming one, and the pressure soon returned to the *individual level*. Nor did keeping patients in this position over considerable lengths of time apparently produce untoward results.

Conclusions.

The blood-pressure index is a valuable guide in major surgical work. It is of special value in operations likely to be of long duration, in which the element of shock is apt to appear; also in operations upon delicate women, weak men, or obviously poor risks. In great operations about the head or neck it is of very definite worth, frequently giving warning, as nothing else could, of approaching asphyxia or cerebral anemia. In the class of cases studied it adds to the operator's sense of security and to the patient's safety. We do not, however, advocate it as a routine measure.

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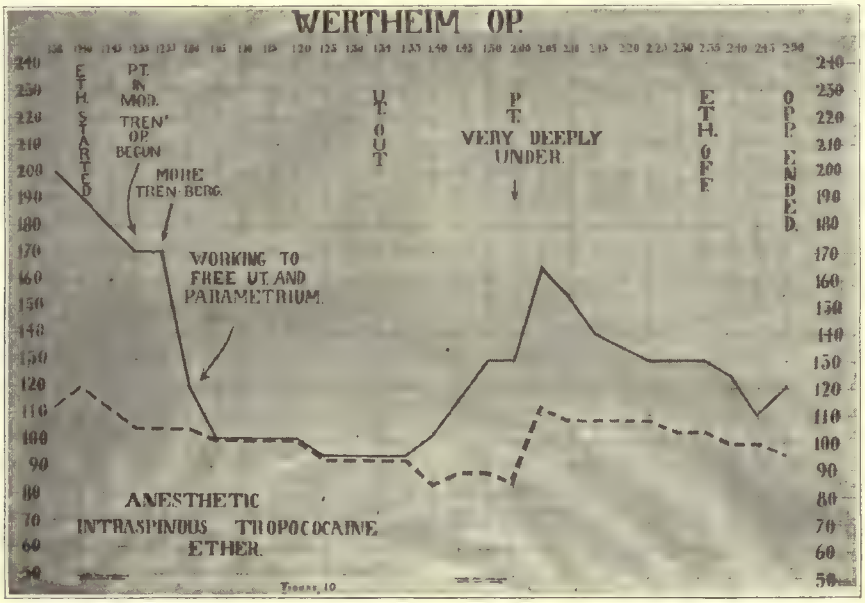

Chart X.—Illustrates very graphically the combined effect of Trendelenburg position and manipulation of the pelvic organs. The latter was undoubtedly the principal factor in this instance, for the drop came almost immediately after the operator began his work in the pelvis. Observe the rise which appeared as soon as the uterus was removed.

Discussion.

Dr. E. I. McKesson, Toledo, Ohio:—Blood pressure readings should be taken as a routine during all major operations, as they give the most reliable information of the patient's condition and the myocardial reserve. The disastolic as well as the systolic pressure must be taken in order to determine the actual heart load. While blood pressure charts have been a hobby of mine and I have recorded thousands, several of Dr. Giddings' are new to me and show certain effects of combined ether and tropococain anesthesia which have not come under my observation. A pulse rate of from 100 to 112 with a systolic pressure of 100 is not typical of shock. Apparently even under deep etherizations the blood pressures do not fall until the tropocain has been added. As Dr. Giddings suggests this may be due to the tropococain reaching the higher centers or its more immediate effect on the vasomotor system through the spinal ganglia and circulatory system. In these particular charts then collapse and not typical shock is indicated. Pressures if taken at the proper moment, will show a fall before there is a rise in the pulse rate. If the heart is compensating the pressure must also rise; otherwise collapse must result. The rise of pressure during the induction of anesthesia is temporary and probably due to psychic causes and comes from the increased pulse rate. By taking both pressures it is possible to determine if circulatory failure is peripheral or cardiac. If the fall in pressures is disproportionate the trouble is peripheral, otherwise cardiac. By using auscultation the blood pressures can be taken very conveniently every five minutes during the operation or more frequently if necessary. A rise in blood pressure is not sustained above the patient's normal. The extreme Trendelenburg posture should never be used. Beyond 10 to 15 degrees it may lower pressures to the shock point. This should never be allowed to occur as recovery is never complete. Struggling and breath holding or respiratory embarrassment will raise pressures from 30 to 40 mm. After years of experiment and clinical observation I am convinced that there is no anesthetic now in use that will raise and maintain blood pressure.

DR. R. M. WATERS, Sioux City, Iowa:—I have found it difficult to draw any profitable conclusions without readings of both pressures. I have noted peculiar falls in pressure associated with changes in posture. One such marked instance occurred after a change from the extreme lithotomy to the horizontal posture. It was very striking. The mechanism of circulatory disturbance is no doubt similar to that occurring in use of the Trendelenburg posture.

DR. W. B. HOWELL, Montreal, Canada:—Is there any drug or method of stimulation that can be used as a routine and depended on to restore and maintain blood pressure and counteract shock?

DR. E. I. MCKESSON, (Closing):—No drug or method is uniformly successful or dependable. It should also be remembered that patients coming out of anesthesia may faint, thereby simulating collapse or shock. This fact may account for circulatory changes due to changes in posture during operations.

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IT IS RATHER A DIFFICULT MATTER FOR THE SECRETARY OF AN ASSOCIATION OF ANESTHETISTS TO CONTINUALLY DEVELOP INTERESTING PROGRAMS UNLESS THOSE ANESTHETISTS WHO ARE ACCOMPLISHING SOMETHING OUT OF THE ORDINARY GET IN TOUCH WITH HIM AND INFORM HIM ABOUT THEIR RESEARCHES AND CLINICAL RESULTS. IF YOU HAVE A CONTRIBUTION TO PRESENT THAT ATTACKS SOME ANESTHETIC PROBLEM FROM A NEW ANGLE DO NOT HESITATE TO WRITE THE EDITOR OF THE SUPPLEMENT SO THAT YOU MAY BE GIVEN A PLACE ON ONE OF THE SEVERAL PROGRAMS NOW BEING ARRANGED FOR THE 1919 MEETINGS. MAKE YOUR PAPERS BRIEF AND TO THE POINT. IF YOU HAVE ANY SUGGESTION FOR MAKING THE MEETINGS MORE INTERESTING SEND IT IN.

HOW ANESTHETICS PRODUCE ANESTHESIA.*

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Many theories have been advanced in attempts to explain the mode of action of anesthetics in producing anesthesia. Bibra and Harles (1847) held that anesthesia was due to the dissolving and direct removal of the fat-like substances or lipoids from the brain cells by the anesthetic. The rapid recovery alone upon cessation of anesthetization is regarded as sufficient evidence to render this theory untenable. According to the theory of Meyer[1] and Overton[2] the narcotics of the methane series produce their characteristic effect by going into solution in the lipoids of the nervous system. The fact that there are so many anesthetics that do not belong to the methane series and are not fat solvents (nitrous oxid and magnesium sulphate being examples), would seem to indicate that the Meyer-Overton theory, while explaining how the narcotics obtain access into the nerve cells, does not explain how anesthesia is produced.

Paul Bert[3] and Arloing[4] showed that oxidation was decreased during anesthesia and that this decrease was more extensive with a powerful anesthetic, such as chloroform than with a less powerful anesthetic, such as ether. Verworn[5] and his pupils consider that anesthesia is due to decreased oxidation, while Crile[6] claims that it is due to the acidosis arising from the diminished or defective oxidation.

The present investigation was begun in an attempt to determine how anesthetics decrease oxidation. We[7] had already found that whatever increased oxidation in the body produced a corresponding increase in catalase, an enzyme possessing the property of liberating oxygen from hydrogen peroxid, by stimuating the liver to an increased output of this enzyme and that whatever decreased oxidation produced a corresponding decrease in catalase by decreasing the output from the liver, and by the direct destruction of the enzyme. Hence, the conclusion was drawn, that catalase is the enzyme principally responsible for oxidation in the body. Stated more specifically, the present investigation was begun to determine if anesthetics produce a decrease in the catalase of the blood and hence of the tissues parallel with the decrease produced in oxidation and if this decrease is proportional to the depth of the anesthesia.

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*Read during the Fourth Annual Meeting of the Interstate Association of Anesthetists in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., Sept. 25-27, 1918.

The animals used in the experiments were cats. The catalase of the blood was determined by adding 0.5 cc. of blood taken from the external jugular vein, to 250 cc. of diluted hydrogen peroxid in a bottle at approximately 22° C., and as the oxygen gas was liberated it was conducted to an inverted, graduated vessel, previously filled with water. After the oxygen gas thus collected in ten minutes had been reduced to standard atmospheric pressure, the resulting volume was taken as a measure of the amount of catalase in the 0.5 cc. of blood. The material was shaken in a shaking machine at a fixed rate of one hundred eighty double strokes per minute during the determinations. The results of the determinations are given in Figure 1. The figures (0-180) along the abscissa indicate time in minutes; the figures (0-40) along the ordinate indicate percentage decrease in catalase.

The anesthetics used were ether, chloroform, nitrous oxid and magnesium sulphate. These widely different kinds of narcotics were chosen intentionally. The chloroform and ether were administered by bubbling air through these anesthetics in a bottle which was connected by a rubber tube to a cone adjusted to the snout of the animal; the magnesium sulphate anesthesia was produced by the subcutaneous injection of 7.5 cc. of a 20 per cent. magnesium sulphate solution per kilogram of body weight, and the nitrous oxid anesthesia by administering a mixture of nitrous oxid in the proportion of 1 to 5, or 80 per cent. nitrous oxid and 20 per cent. oxygen. The curves in Figure 1, marked chloroform, nitrous oxid, ether, and magnesium sulphate were constructed from data obtained from cats during anesthesia produced by these different anesthetics. It will be seen that chloroform decreased the catalase of the blood 28 per cent. during the first fifteen minutes of anesthesia, 34, 38 and 36 per cent. during the succeeding fifteen minute intervals. Nitrous oxid decreased the catalase of the blood 11 per cent. during the first fifteen minute interval, 14, 19, 17 and

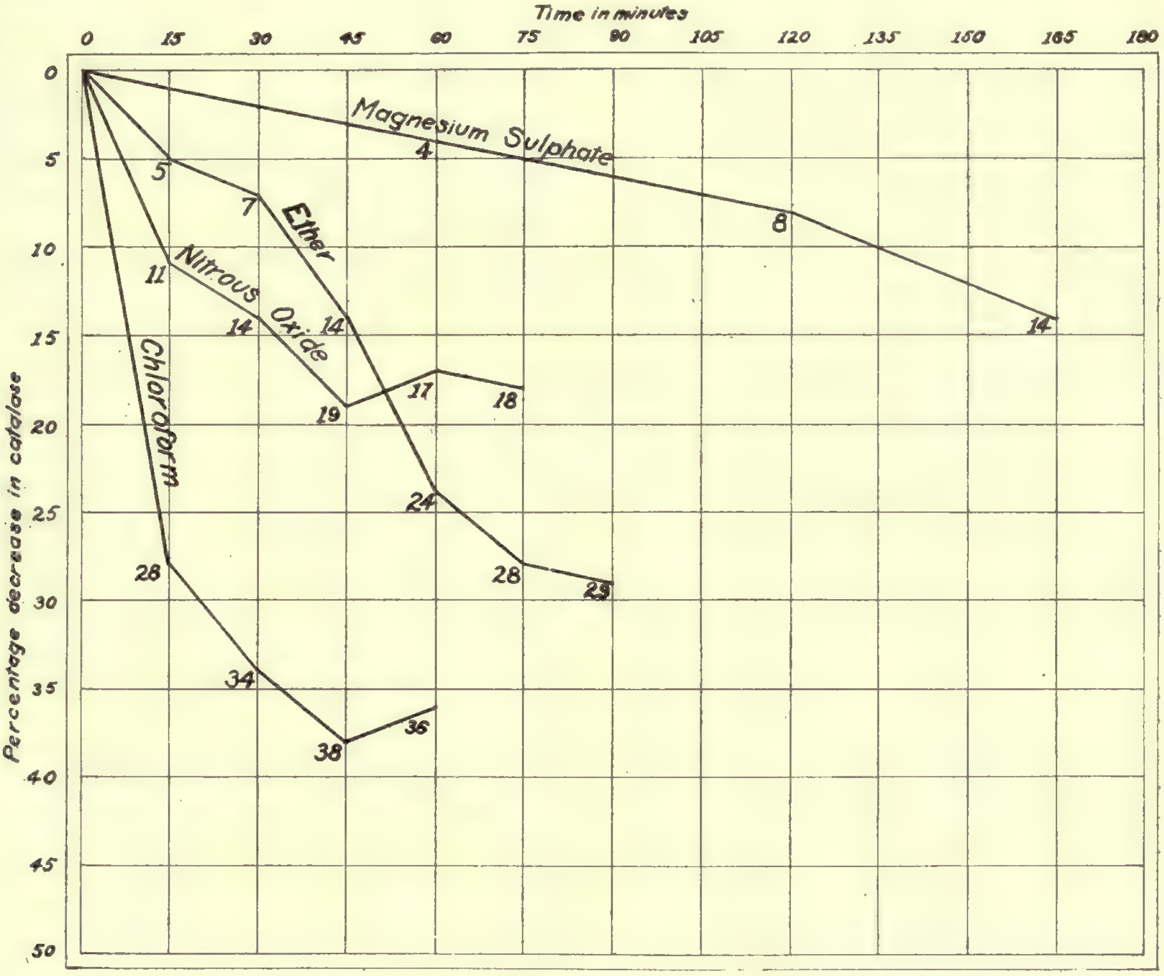

Figure 1.

18 per cent. during the succeeding fifteen minute intervals. By examining the curves marked ether and magnesium sulphate, the rate and extent to which these anesthetics decreased catalase may be seen.

If narcosis is due to decreased oxidation and if this decreased oxidation in turn is due to a decrease in catalase then the destructive effect of an anesthetic on catalase should be an index to the character of anesthesia produced by the anesthetic in question. By comparing the rate and extent of decrease produced by the different anesthetics used it may be seen that chloroform, in keeping with its rapid and powerful action, decreased the catalase of the blood most extensively and abruptly; that nitrous oxid, in keeping with its rapid, but less powerful action, produced a very abrupt decrease, but not such an extensive one; while ether, in keeping with its more powerful, but less rapid action, produced a more extensive, but less abrupt decrease than did nitrous oxid; magnesium sulphate decreased the catalase of the blood very slowly, and not very extensively.

It should be said in this connection that no attempt was made in the experiments described to administer the anesthetics in equimolecular concentrations. All except the magnesium sulphate were administered in sufficient concentrations to produce a fair degree of anesthesia by the end of the first fifteen minute interval, and the amount administered during the remaining periods was such as to keep the animal in fairly deep but safe narcosis. We have found that by choosing large, active cats with blood of high catalase content, and by forcing the anesthetic it was possible to decrease the catalase much more quicky and extensively than was done in the preceding experiments, but even in these cases it was found that the same relationship held; that is, chloroform produced a more abrupt and extensive decrease in catalase than did nitrous oxid or ether; while the nitrous oxid produced a more abrupt but less extensive decrease than did ether. We also found that when the catalase had been decreased as far as it could be by the use of nitrous oxid, it could be decreased considerably more by changing to chloroform. It may be that the greater tendency toward acidosis in chloroform narcosis is due to this greater destruction of catalase with resulting decrease in oxidation, and to the greater injury of the liver, the organ in which catalase is formed.

SUMMARY.

1. Narcotics of widely different constitution, such as chloroform, ether, nitrous oxid and magnesium sulphate, decrease the catalase of the blood, parallel with the increase in the depth of narcosis.

2. A very powerful anesthetic, such as chloroform, decreases the catalase more quickly and extensively than does a less powerful anesthetic, such as ether. Slowly acting anesthetics, such as magnesium sulphate, decrease, accordingly, the catalase of the blood more slowly than a quickly acting anesthetic such as nitrous oxid.

3. As a result of the experiments reported in this paper, and of work done previously on the anesthetics in this laboratory, the theory is advanced that narcosis is primarily due to the decrease in catalase produced by the decreased output from the liver, and by the destruction of catalase by the narcotic, with resulting decrease in oxidation and increase in acidosis.

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ANALGESIA AND SHORT ANESTHESIA IN DAILY PRACTICE.*

WILL WALTER, M.D.,
EVANSTON, ILLS.

Pain is a relative sensation. Its intensity varies with individuals, as we all know, but this variation depends more than we realize upon differences in things physical as constitution and inheritance and temporary state; or as to mental attitude, such as continued or recurrent irritations, worries; and with fever, and degrees of fatigue. Many persons are called brave and plucky who know not the suffering from major injuries or surgical manipulation which others get from a pin prick. Some races are praised for great endurance under stress of all types when indeed, because of physical conditions or the evolution of protective functions against the sensation of pain or its lack of perfection as a sensation, they do not suffer.

Dr. George Crile,[1] who early made observation at the war front in this regard, told me that the exhausted man had little sensation of pain remaining. The added pain of operation is trivial compared with the previous suffering.

It is probable that the sensation of pain is a function becoming or remaining active according to its protective value and when it fails of manifestations it is either disordered, as for instance in pituitary disease, or of no value because of the enormity of the injury, as by instantaneous severing of a limb; or its needlessness as in brain or bone injury or in exhaustion states.

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*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ill., June 10-11, 1918.

Pain is rendered keener, by repetition,—a cumulative stimulus, as in the field of the special senses,—and its experience in and after childhood, makes for hyperesthesia throughout life.

We are a sensitive nation comparatively. There are exceptions due to racial and individual variations, but in general in daily practice we encounter hypersensitive patients.

And because of the evils of early inflicted pain and the cumulative stimulus of its repetition, it should be our business to save the suffering daily experience by our patient. The painful examination, the opening of furuncles, paracentesis, removal of foreign bodies, setting fractures, reducing dislocations, introduction of sutures and their removal, first dressings of open wounds and burns, skin-grafting, passing of probes, minor operations of types too numerous to mention; in fact all painful procedures should be rendered painless if we are to save the shock which would tend to produce a nervous, fearful state, and to save the suffering which unnerves.

And it is no simple problem to accomplish this practically. Local anesthesia is not suitable for the young because of the pain of the primary injection. The skin is the region producing the most reaction. Nor is infiltration of inflamed areas altogether desirable or very effective.

We have in nitrous oxid-oxygen the ideal means if some of the existing difficulties may be overcome; and some of the measures evolved to meet them may be best studied by enumerating what they are.

The first difficulty has been that it required too much time to get things ready. Apparatus has been complicated, requiring mechanical genius or at least experience to get it going.

The second is the need of assistants to cooperate in its administration.

The third is the safty element.

The fourth is the expense incident to its use.

The first or the element of time now favors nitrous oxid-oxygen with modern apparatus as compared with infiltration anesthesia since the latter requires sterilization of needles, preparation of solutions and time for infiltration. With regard to other forms of anesthesia such as morphin-scopolamin and ether there must be added the needed preparation, the prolonged time of induction, and after effects of variable duration.

The safety apparatus which we use[2] has only to be turned on to the required flow. It does not take a minute to have ready. Also it is available away from the equipment for short cases, like paracentesis or abscess drainage, and dressings, by simply loading the bag and detaching it for carrying to the patient. The tight mask and the unleakable bag and attachments make it sure and convenient. During the past three years we have many times taken the loaded bag to the patient's residence for these short operations and for dressings or even for induction of ether anesthesia.

The second difficulty, that of assistants, is not so easy to meet, because certain types of patients do not take any anesthesia well, and require a deal of restraint. But in general and especially with the young who require restraint, what ever is being done, no added help is needed if the apparatus is simple and delivers its ratio of gases without undue attention. We shall see that the trick in this is to get genuine analgesia as we define it and avoid the need of enforced restraint by not going over this borderline.

As to the third or safety elements, these, in nitrous oxid-oxygen anesthesia, are: (A) that no high pressures be ever possible. With 800 and 1,200 lbs. pressure in tanks it is not safe to administer gases without intervening reducing valves and safety devices; and although underwriters class such apparatus as hazardous they are still found frequently in use; (B), we must know that the oxygen and nitrous oxid are flowing as shown by the indicators, and this does not follow in apparata depending upon the opening of valves to greater or less dimensions. If the pressure varies the flow varies, and stop cock and springs and friction valves are not dependable. Types which show actual flow are necessary. This is most important in apparatus for uses of which we are speaking, *i. e.,* where no anesthetist is present, and the practitioner is handling the anesthesia himself; because the second element of safety in nitrous oxid anesthesia is in reality *oxygen.*

Unless there is sufficient oxygen to sustain life there is loss of residual air,—oxygen starvation,—and death results. The requirements of oxygen are not less than one ounce per hour or four gallons by volume. But as there is always loss of gases even with the tightest masks, the allowance in an apparatus for safety should be not less than thrice the actual need, *viz.,* twelve gallons per hour. This must be the actual amount flowing and not simply the amount which *should* be flowing according to an indicator.

There is still another element of both time and safety in nitrous oxid-oxygen employment, which is that the *analgesic state* is the desirable one to maintain. Analgesia as we define it is a borderline state, *i. e.,* anesthesia just short of unconsciousness without the sensation of pain. "It hurts but you don't feel it!"[3] The ratio of oxygen to nitrous oxid is the determining factor in this[4] and hence must be controlled definitely. Over this borderline is where the patient loses control, fights, resists or what not, if that is his bent.

We do not now think of analgesia as anything short of anesthesia and define as hypesthesia those degrees of lowered pain sensation which are short of anesthesia with consciousness. It would seem better to insist upon this distinction as it is important.

In the minds of the profession the word analgesia has come to signify modified sensation of pain and the term has come to be employed loosely. Analgesia means *without pain* quite as much as anesthesia. We have also fallen into the habit of speaking of degrees of analgesia and of anesthesia. In view of the resulting confusion it would seem proper to limit the term analgesia to loss of sensation without loss of consciousness. This would then apply to local obtunding by infiltration, nerve-blocking or nitrous oxid-oxygen analgesia. Anesthesia would then apply to loss of sensation and also consciousness. It would then be possible to adopt the neurological term hypesthesia for lowered, though not lost sensation and hyperesthesia for heightened sensation.

I am led to believe, therefore, that there is a stage of relaxation with gas-oxygen adequate for any operation without the deep relaxation which injures. It is aided by preliminary medication with morphin and scopolamin one hour before. While we do not yet know just what the objective signs are, some day perhaps we shall learn to maintain analgesia with relaxation,—genuine anesthesia short of unconsciousness,—and then we shall have attained an ideal. Then we shall not have post operative *organ recitals* nor shall we permanently injure our patients, neither their nerve nor their muscle tonus. Toward that end we are tending. Improved technic will, I am sure, help us to attain it and for this we must depend in no small degree upon simplicity, safety, efficiency and accuracy of apparatus.

We cannot know much definitely unless we have an accurate measure of the ratio of gases. Analgesia can be appreciated in no way so well as by self experimentation.

Much may be done with patients in the hypesthetic state (oxygen, 25-40; nitrous oxid, 75-60 per cent.), if they are controlling themselves well, the edge is taken off the pain and it is made more easily endured.

Patients are tided over by it and may be maintained in this state for a long time and then swing into analgesia by lowering the oxygen ratio below 25 per cent. and down to around 15 per cent.; but when we get toward 10 to 5 per cent., general anesthesia with unconsciousness supervenes.* Hence the need of accuracy in measurement of the gases. In the analgetic state, as we define it, the patient feels no pain but is conscious of what is going on, and sufficiently so to respond to suggestion, to do what you tell him, but there being no voluntarily motor control, he will not answer.

With sufficient oxygen in the mixture there is little danger from gas-oxygen. Nitrous oxid contains no oxygen available for respiration. We should really put the matter reversely and say: Enough oxygen must be given to supply respiratory needs and if we supply that we are safe, and having that supply the degree of thesia, whether hypesthesia or analgesia or anesthesia, is determined by the amount of added nitrous oxid. The volume of combined oxygen and nitrous oxid is variable with the depth and volume of respiration. There must be enough flowing to supply the needed volume.

Uncertain measures are not safe. Extraction specialists employing gas without oxygen added would do well to study this exact method. It would save them much hurrying and make their work much easier. With the further addition of suction to carry off the blood from the site of operation as now practiced in tonsillectomies, their difficulties would be minimized and their operations become smooth, safe and dignified procedures throughout.

As to the element of cost. With former types of apparatus the expense was high, due to loss and improper use of gases. Much of this loss was through the improperly fitted mask. Much of it was due to forcing gases to the patient under pressure, so that it came to him even against his expiratory effort instead of merely flowing to the bag, allowing him to breath it naturally. With late models and improved methods we run on less than 50 gallons of nitrous oxid per hour, which is one-third of the early cost. To be exact, we are now running at a cost of about $1.00 per hour, or for short cases of analgesia 10 to 15 cents per patient.

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* Increased rate or depth of respiration does not give anesthesia, given a low ratio of nitrous oxid to oxygen less than 80 to 85 per cent. The percentage of oxygen is the controlling factor, not the respiratory function.

As the time saved more than compensates for that, we are no longer thinking of this element.

According to our title we should limit our discussion to analgesia and short anesthesia in routine practice; but by the use of proper technic many cases hitherto thought major types, and indeed made major operations by ether, become minor affairs.

Dr. Ben Morgan, an expert in ether, has made a good point in emphasizing that the athlete who has been completely relaxed and flabby under ether never regains his athletic powers.

We go further and state that no adult who is deeply relaxed comes back with the same muscle tonus,—commonly called *pep,*—whether this relaxation is from ether, a knock-out in the boxing ring, or from tonus killing morphin combinations; nor indeed from relaxing types of pyogenic or exhausting diseases. The athlete knows it because he has reason to. He has certain peak loads to carry which he at once finds he can't do. But the every day fellow finds it out if he watches himself.

As Morgan says, the patient will tell you long after operation, like appendectomy, that he has not been the same since his appendix was removed. The fact is he should date his reversal from the day he was so *ether-logged.*

During the past fifteen months I have had personal experience with nitrous oxid-oxygen having taken it something over fifty times to relieve the excrutiating pain caused by manipulation of a fractured shoulder, and the conclusions to which I have come are: that anesthesia with consciousness is possible; that in this state the subjective sensation of pain is present but is not felt; also that relaxation is on this borderline and that the percentage of oxygen in the mixture is always the determining factor.

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There is a shortage of qualified and licensed anesthetists. To fill the need stimulate the interest of some physician or dentist in your home town in taking up the specialty. Help him to launch himself successfully and bring him in as a member in one of the associations of anesthetists. The effort will repay you in many ways.

LOCAL ANESTHESIA FOR PENETRATING BRAIN WOUND OPERATIONS.

Major Harvey Cushing, director of U. S. Army Base Hospital No. 5 in France, has enjoyed clinical advantages that make his contribution on Penetrating Brain Wounds (*British Medical Journal,* February 23, 1918) of much more than ordinary interest. Aside from the purely surgical features of Cushing's conclusions, drawn from an experience of some 225 recorded cases, his use of local anesthesia is perhaps the most significant point in the technic of his operative procedure.

During the shaving of the head, possibly an hour before the patient's turn will come, a sedative is given, 1/3 grain of omnopon (pantopon) usually being sufficient, though this may be repeated if the patient is very restless or obstreperous. Then 15 or 20 minutes before the operation, in the lines of proposed incision, Cushing infiltrates the scalp with a 1 per cent. procain and adrenalin (15 drops to 30 cc.) solution in the sub-aponeurotic layer.

There exists a difference of opinion regarding the relative merits of general versus local anesthesia for cranial operations. Cushing confesses to an original prejudice in favor of inhalation narcosis, but his experience in war surgery has led him completely to alter his view.

General narcosis increases intracranial tension, which exaggerates the difficulties of an operation already difficult enough. It increases bleeding from the scalp, which, with the procain-adrenalin solution is rendered negligible. It encourages the use of rougher methods, which a patient under local anesthesia would not tolerate, and which, therefore, are in all likelihood harmful. It encourages speed, which is to be decried if employed at the expense of delicacy. It leaves many patients, particularly those with threatened respiratory difficulties, in a condition in which inhalation troubles are prone to occur.

Until recovery from a general anesthetic is complete every patient should be under close observation, and this, at a casualty clearing station at least, is impossible. It is very rare, and then only in case of semi-conscious patients or those with restless irritability, that the operation cannot be carried through under local anesthesia, though this necessitates more gentle manipulations than those usually employed, particularly during the process of removing the area of cranial involvement.

Colonel H. M. W. Gray, R.A.M.C., has found omnopon (pantopon) preferable to morphin for pain relief and alkaloidal amnesia, because its depressing effect on the vital centers and on metobolism is not manifest to anything like the same degree. Two-thirds of a grain of pantopon is equivalent in sedative action to about ¼ to 1/3 grain of morphin.

J. Anderson (*British Medical Journal,* July 14, 1917), adds magnesium sulphate to his local analgesic solution, utilizing the following formula:

Procain	0.75 per cent.
Magnesium sulphate	0.50 per cent.
Normal saline	100. per cent.

To each 30 mils of this solution 1 mil of adrenalin solution (1 to 1000) is added. This provides a somewhat longer duration for the obtunding effect.

The main features of the routine procedure for handling penetrating brain wounds developed by Cushing from his extended experience and those of other operators, are as follows: (1) The removal *en bloc,* rather than piecemeal, *of the area of cranial penetration.* (2) The detection of the in-driven bony fragments by *catheter palpation* of the track, rather than by the exploring finger. (3) The *suction method of removal of the disorganized brain,* thereby cleansing the track of the so-called pulped or devitalized tissue, the retention of which, as is the case with dead tissue anywhere, favors infection. (4) The use of *dichloramine-T in oils as an antiseptic* particularly suitable for infections in the central nervous tissues.

In addition to these more essential features of the operative procedure, the routine preoperative neurological study of the case; stereoscopic *x*-ray negatives; the shaving of the entire scalp; the invariable use of *local anesthesia* supplemented with alkaloidal amnesia; preferential tripod rather than flap incisions; foreign body extraction with the magnet when possible; closure of the wounds with buried sutures in the galea; the dressing of all serious cases in the operating room rather than in the wards —all these steps, though less novel, were found to be contributory to the successful outcome of the more severe cases.

By utilizing two or three tables for each operating team, series of cases may be handled without delay, the neurological examination, *x*-ray exposure, shaving of the scalp, hypodermic and local anesthesia injection, all of which are time-consuming, being carried out during the operating period of the previous case.

It is to be noted especially that Cushing's entire technic has been an elaboration of the velvet-touch method of operating, which is an essential for all procedures done under local anesthesia. In this connection it should also be emphasized that the use of alkaloidal amnesia, puts the patient in a sufficiently drowsy condition not to mind the use of trephine, drill, or ronguer, the effects of which are somewhat distressing when local anesthesia is used alone.

The summary of the results of examinations of blood presure in head wounds, in the report of the British Medical Research Committee, December 25, 1917, is of interest in connection with the subject under discussion. Fraser and Cowell conclude that:

The blood pressure subsequent to wounds of the head is apt to be unstable. If operation is performed under general anesthesia before the blood pressure has become stable, disaster is liable to ensue. The possibility of such an ill result can be diminished by delaying operation until the blood pressure has become stable or *by performing it under local anesthesia, supplemented with scopolamin-morphin.*

THE AUSCULTATORY CONTROL OF VAPOR ANESTHESIA.*

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INDIANAPOLIS, IND.

In an effort to meet a shortage of proper anesthesia apparatus for head surgery in the American Expeditionary Force, and at the same time provide a suitable device for the administration of the accepted high-volume, low-tension ether vapor for operations about the head and face, by the intrapharyngeal method, the illustrated apparatus was assembled from material that every base hospital has in stock. With a photo or drawing of this device at hand its assembling should not take more than an hour's time.

The apparatus supplants the high-priced and complicated (but good) devices now on the market for anesthesia in head surgery and produces results equally good in a simpler manner. The anesthetic novice will learn to operate it much more readily than the more intricate devices. Also the auscultatory tube, which is a feature in intrapharyngeal anesthesia that, I believe, has never before been used in this way, is a great help in the maintenance of an even and light anesthesia. It is of particular value in the dark-room for the removal of foreign bodies about the head, under fluoroscopic control. In fact it was the need of some method of control in dark-room anesthesia that prompted the conception of the auscultatory tube for this purpose. It has worked out so well that it has been used in anesthesia for general surgery as well as to facilitate the maintenance of even anesthesia.

There is less ether wasted with this apparatus than with those devices which employ a hot place for the vaporization of the ether.

The apparatus consists of: (1) A dental foot-bellows; (2) a rubber tube, through which air is carried into the other container. By manipulating the Dakin clamp on this tube the percentage strength of the ether vapor is controlled by regulating the amount of air passing through the ether; (3) A rubber tube through which a stream of air passes to the patient without passing through the ether container. By manipulating the Dakin clamp on this tube, in a direction contrary to that of the inlet tube, the strength of ether vapor delivered to the patient may be further controlled; (4) a

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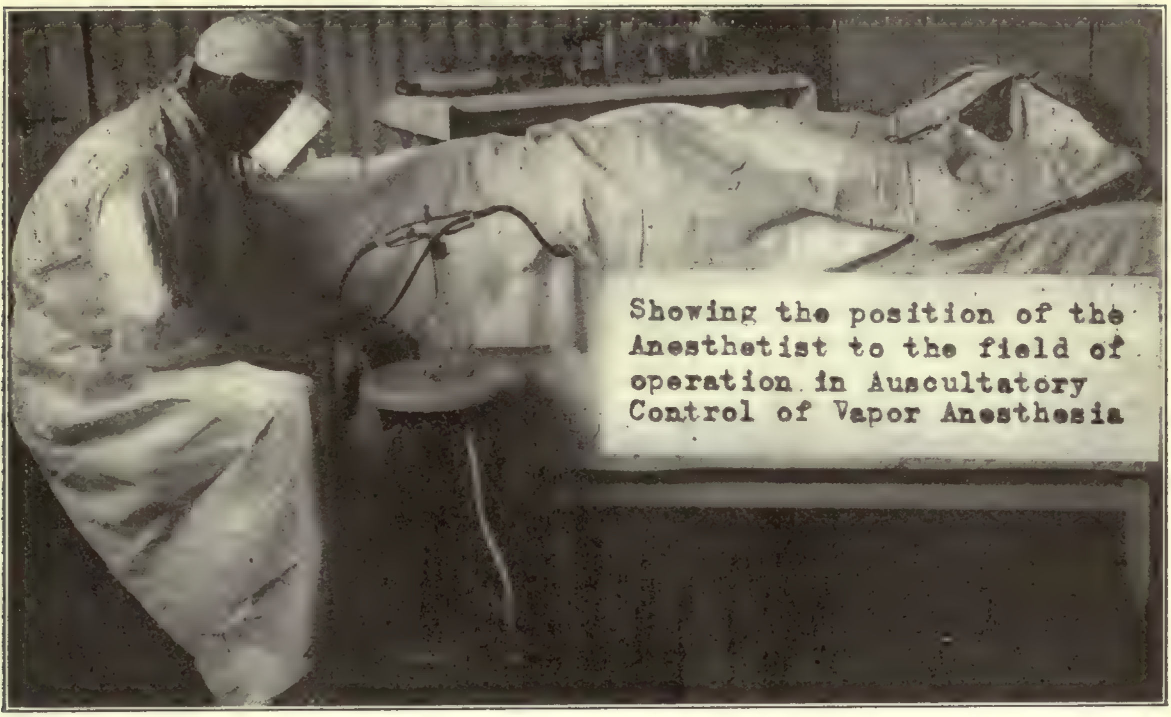
*Read by proxy during the Fourth Annual Meeting of the Inter-State Association of Anesthetists, in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., Sept. 25-27, 1918.



Showing the position of the Anesthetist to the field of operation in Auscultatory Control of Vapor Anesthesia

Fig. 1. Showing the position of the Anesthetist to the field of operation in Auscultatory Control of Vapor Anesthesia.

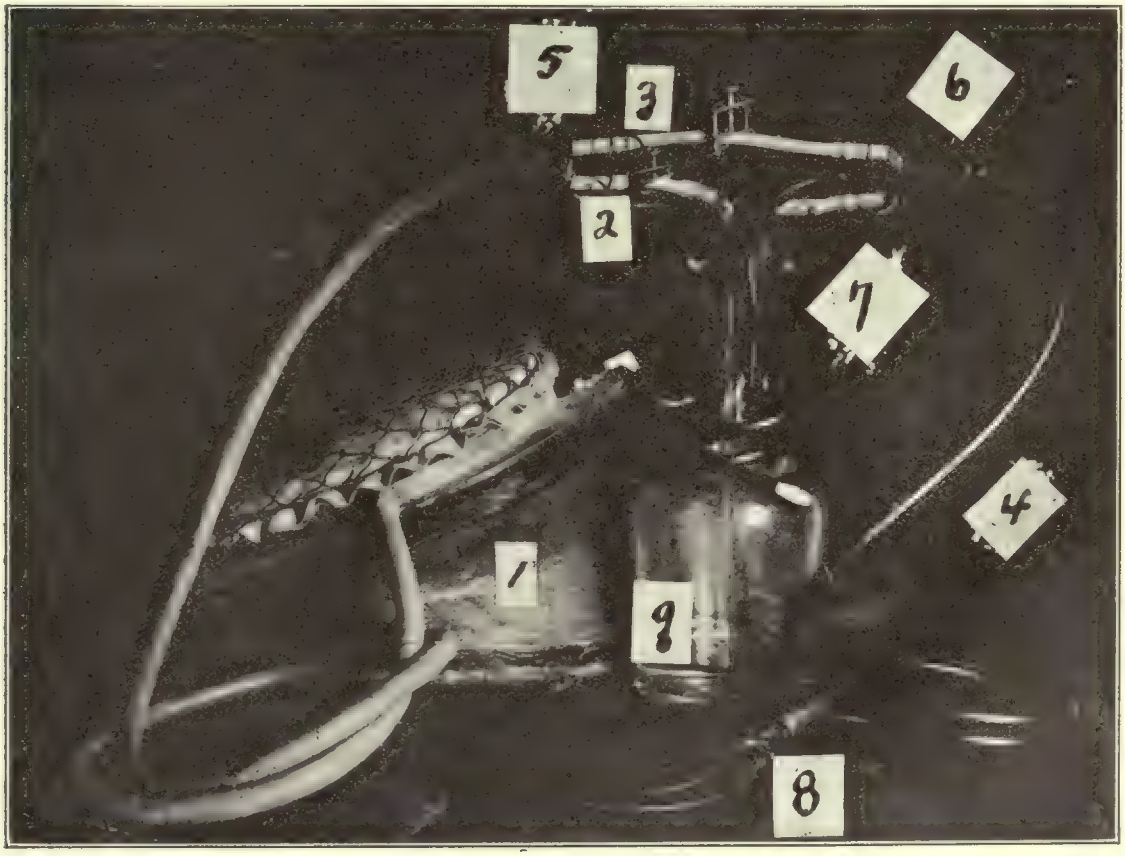


Fig. 2. Close-up of Apparatus fully assembled.

rubber tube which carries the mixture of ether and air to the patient. This tube is 4 feet in length, thus enabling the anesthetist to sit well out of the way of the operators; (5) Dakin *U* glass distributing tube for the purpose of dividing the air current between the ether bottle and the patient; (5) Dakin *3Way* distributing tube for the purpose of combining the streams of pure air and etherized air, and for the connection of the auscultatory tube; (7) The *Auscultatory Tube,* which conveys all the information that the anesthetist may need regarding the condition of the patient.

Through this auscultatory tube the anesthetist may determine the following: (a) the patient's respiration; (b) whether or not the patient is swallowing, or (c) the patient's larynx is being flooded with mucous. This complication is rare with the high-volume, low-tension ether vapor method of anesthesia, because the end openings of the nasal tubes, when in position, are just above the larynx and the volume of etherized air is sufficient in most cases to blow all excess mucous into the mouth, from which it is either allowed to drain or is milked-out by pressure of the cheek; (e) the slightest effort of the patient to cough or vomit, indicating too light anesthesia, a matter that may be immediately remedied by deepening the narcosis; (f) the amount of air bubbling through the ether, thus helping to ascertain the strength of the ether vapor. This strength may also be determined by removing the auscultatory tube from the ear and smelling the ether vapor flowing through the tube, as it is always the same percentage strength as that being delivered to the patient. This auscultatory tube is particularly valuable in dark-room work, such as the removal of shrapnel under the fluoroscope. Here the anesthetist need not see the patient at all. He conducts the anesthesia entirely in accordance with the signs obtained through the auscultatory tube; (8) Dakin *U* tube connected with two catheters which are passed through the nostrils into the pharynx, and (9) the ether container.

The accompanying photograph shows the position of the anesthetist and apparatus with relation to the patient and the field of operation, with the auscultatory tube in place.

In conclusion, it may be remarked that the auscultatory tube furnishes more definite information as to what is going on in the patient's throat and chest than can be had in any other way, not excluding the use of the stethescope continuously over the chest. In cases where it is necessary to watch the pulse of the patient, this is easily accomplished at the wrist on the radial artery.

AN APPARATUS FOR DOSIMETRIC ANESTHESIA FOR FIELD AMBULANCE, EMERGENCY SURGERY AND OBSTETRICAL USE.*

M. L. TOWNSEND, M.D.
Captain, U. S. Medical Corps, Field Ambulance Service, American Expeditionary Force, France.
CHARLOTTE, N. C.

In Field Ambulance service, emergency surgery and obstetrics the physician or medical officer is repeatedly confronted with the problem of giving an anesthetic and operating or delivering without an assistant, either skilled or otherwise. This necessity prompted the designing of an anesthetic inhaler as automatic and dosimetric as could be made. The inhaler, herewith presented, is simple, compact and always ready for use. It is an inhaler and container combined and packs into so small a space that it may be carried in the pocket or emergency grip, filled and ready for instant use.

It furnishes a steady, uniform, dosimetric vaporization of the anesthetic without requiring any dropping of the agent; and can be automatically set to deliver certain percentage strengths of the anesthetic used.

As the accompanying illustrations show, the inhaler is composed of a mask and container. When closed the container screws into the mask, sealing itself so that the ether or chloroform within neither evaporates nor deteriorates. To prepare the inhaler for use the container is unscrewed from the cap inside the mask and engaged in the outer socket and screwed into place so that the O of the dosimetric scale is opposite the nasal end of the mask. The mask is so modeled that it will fit any sized face and nose without the need of a rubber air cushion or gauze sponges. The inhaler is indestructible and can be washed or sterilized in any desired manner without fear of damage.

The inside of the container is fitted with sheet metal, concentric rings, covered with absorbent material. These concentric rings are so arranged that when engaged, with the mask in use, the vaporization of the anesthetic may be controlled dosimetrically by turning the container on the mask, either to right or left, as a stronger or weaker concentration is desired. The contents will not spill out irrespective of the position of the inhaler.

This device is not only simple, sensible and practicable, but comparatively reasonable in cost. It requires no renewal of its absorbent material and as there are no complicated parts to get out of order, its upkeep is negligible. Also it will induce and maintain anesthesia with about one-half the amount of any anesthetic required by open methods of anesthesia and this advantage makes for economy.

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*Read by proxy during the Fourth Annual Meeting of the Interstate Association of Anesthetists, in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., Sept. 25-27, 1918.

Its greatest advantage, however, is the increased safety to the patient. Because of the uniform, dosimetric anesthetic vapor provided, there is no *coming out* one minute and *drowning* the next. The operation of the inhaler is so simple that any anesthetist, even a novice, may expect satisfactory results.

Figs. 1 and 2. The Townsend Inhaler in use in Field Ambulance Service and in Obstetrics.

The container will hold approximately 100 cc. of ether, chloroform or anesthol and if the anesthesia is of sufficient length to exhaust this amount, the container may be immediately refilled by using the mask as a funnel.

In Field Ambulance service, or emergency surgery, whether of a military or civilian sort, this inhaler, in the originator's personal experience, has satisfactorily met all demands made upon it. Soldiers in service almost routinely present for operations with their stomach full of slumgullion, and in spite of this lack of preparation for an anesthetic, the use of this inhaler, providing a minimal dosage and absorption of the anesthetic, has been followed by a very low percentage of after-nausea. While the percentage strength of anesthetic vapor must be rather rapidly raised during induction, the patient's more or less fixed dosimetric requirement during the stage of maintenance is readily determined and can be kept at that level to the end of the operation.

In obstetrics the inhaler may be used by the parturient woman herself, after the dosimetric requirement to obtund the pains of labor has been determined. There is no danger of overdosage, for with waning consciousness and the onset of relaxation the inhaler drops away from the patient's face, to be reapplied by the woman at the next pain. The dosimetric requirement for continuous, light anesthesia during delivery may be determined by the obstetrician and maintained by an attendant holding the inhaler in place.

GENERAL ANESTHESIA IN WAR SURGERY.

P. PICARD.

Interne des Hôpitaux de Paris, Médecin Aide-Major.

This procedure, inspired by that of our preceptor, M. Savariaud, (*La Presse Medicale*, No. 55, 1917), has rendered us the greatest service during the most intense activity of our Unit. Since January, 1917, we have employed it exclusively for all our general anesthesias.

Simplicity and rapidity of anesthesia, without complicated apparatus so difficult to procure, are of great importance from the standpoint of surgical service. It is on this account that we recommend this simple, convenient and easily-constructed apparatus.

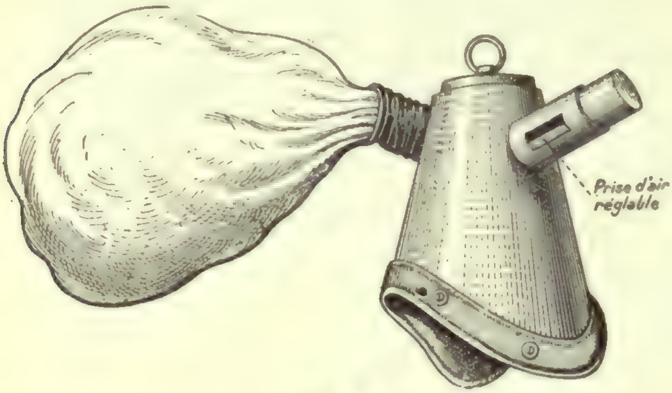

Fig. 1.

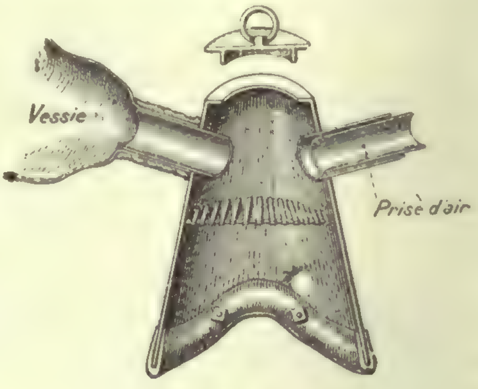

Fig. 2.

Apparatus—It is similar to but larger than that of our comrade Dr. Noiré, employed for prolonged, general anesthesia with ethyl chlorid. The mask is a truncated cone of galvanized metal 12cm. high. The bottom is modeled to accurately fit the nose, cheeks and chin. To accomplish this it is reinforced with a thickened border. The top is closed by a cover which can easily be removed. The inside o fthe mask is divided, by a metal-mesh partition, into compartments of about equal size. The upper compartment is the resorvoir for the anesthetic. Near the top and to the left it is connected with a rebreathing bag (as in the Ombrédanne and Camus inhalers), so that the respiration may be partially or entirely confined. Symmetrically and to the right is an air-vent, easily regulated, formed by two sleeved tubes, with overlapping openings 2 cm. by 0.007 mm.

Anesthesia.—The choice of the anesthetic is not indifferent. We employ exclusively Schleich's Mixture (ether 60 grams, chloroform 20 grams and ethyl chlorid 10 grams), which is easily made. For a long time J. Louis Faure has drawn attention to this mixture. Upon the anesthetic table is a graduated glass and flask of Schleich Mixture, prepared in advance. When everything is in readiness for the operation, and the wounded patient has been placed on the table, the apparatus is charged. Two medium-sized, fluffed compresses of gauze (which are renewed for each operation), are placed in the reservoir, and saturated with 20 cc. of the mixture, poured from the graduate through the top aperture.

The cover is closed, the inhaler is gently placed over the face *with the air-vent wide open.* After two or at most three expirations, the air-vent is closed and the inhaler closely adapted. The rebreathing bag is fully distended. The period of excitation is either absent or negligible, even in alcoholics. In two minutes the time necessary for the preparation of the field of operation, muscular relaxation is complete, and the narcosis remarkably calm.

After the operation is begun nothing remains but to maintain anesthesia and watch the condition of the patient.

The initial dose of 20 cc. assures a period of at least from 8 to 10 minutes of anesthesia, after which, to maintain anesthesia, it is necessary to add 5 cc. of the mixture every 7 minutes. This dosimetric administration of the mixture is accomplished through the upper aperture of the inhaler without displacing it.

Ordinarily the air-vent remains completely closed, and is only opened when necessary.

The return to consciousness is rapid and complete. Nausea is rare and vomiting not more frequent than with chloroform. We have administered 500 anesthesias without untoward incident.

American Journal of Surgery

QUARTERLY SUPPLEMENT *of* ANESTHESIA *and* ANALGESIA

Surgery Publishing Co.
J. MacDONALD, Jr., M.D., President and Treasurer
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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Avon Lake, Ohio, U.S.A.

JANUARY Editorials. 1919.

THE UNIVERSITY OF CALIFORNIA ESTABLISHES POSTGRADUATE INSTRUCTION IN THE SPECIALTY OF ANESTHESIA.

In Official Bulletin No. 18, W. E. Musgrave, Supt. of the University of California Hospital, announces the establishment of postgraduate instruction in the specialty of anesthesia. This course is in addition to the instruction in anesthesia given medical students and interns and is open to physicians who are graduates from schools acceptable to the hospital and who furnish satisfactory evidence of uprightness and health. The duration of the course is three months and is repeated three times a year, as follows: June, July, August; October, November, December; and February, March, April.

Classes are limited to four. Lectures and demonstrations are given in the afternoons and practical work during the morning hours. The following is a brief outline of the course: (1) History of Anesthesia; (2) Ethics of Anesthesia, including the relation of the Anesthetist to the Surgeon; (3) Physiology of Anesthesia; (4) Properties of various Anesthetic Agents; (5) Choice of Anesthetics; (6) Anesthetic Emergencies; (7) Modern Anesthetic Apparatus and Its Uses; and (8) Anesthetic Records.

The practical work includes the giving of anesthetics under the supervision of one of the teachers and will be arranged for in the University of California Hospital and other institutions.

The instruction is in charge of Dr. Mary E. Botsford, Chief, and Drs. Mary Kavanagh, Henrietta Duggan and Mary Turnbull Murphy, Assistants.

The University of California is to be congratulated on its progressive attitude in establishing this course. Medical schools have too long neglected the opportunities that lie open to some of their students and graduates in the specialty of anesthesia. It is also a striking sign of the times that this course should be entirely under the control of a group of noted women physician anesthetists of San Francisco. The Editor looks forward to the immediate and continued success of this venture.—McM.

A THOROUGH KNOWLEDGE OF THE SPECIALTY OF ANESTHESIA AND ANALGESIA.

Several years ago the Editor of the Supplement pointed out the advisability of specialists in anesthesia acquiring a thorough knowledge of both general and local anesthesia. Not long since Willy Meyer of New York has emphasized the fact that all large hospitals should have on their staffs some one or more members who are entirely familiar with the technic of local anesthesia as it applies to routine operative procedures. Meyer makes this suggestion because the surgeons are still few and far between who take any interest in the intricacies of either general or local anesthesia. While a larger number of surgeons are interesting themselves in local and regional anesthesia, not all of them acquire the knack of using these methods satisfactorily and not a few have not the time to waste on using local anesthesia. In this situation it is up to the anesthetist who wishes to be a full-fledged specialist to master local and regional anesthesia as well as general narcosis.

As an evidence of how such a specialist is of peculiar value the Editor would point out the fact that during the mobilization of the Anesthetic Service for the medico-military establishment a certain member of the Associated Anesthetists was detailed to one of the largest cantonment Base Hospitals to supervise its anesthetic service. At the time an epidemic of broncho-pneumonia had left in its wake many cases of empyema, requiring operative interference. Ordinarily these cases would have been handled under some method of general anesthesia to the great discomfort of the soldier patients. The anesthetist in question, however, was an all-around specialist and suggested that the necessary rib-resections be done under local anesthesia, and his suggestion was not only accepted, but he was given the opportunity of personally doing the work. Sixty costallectomies were thus satisfactorily done under local anesthesia to the gratifying satisfaction of all concerned.

During the waiting period of the local anesthesias and the time of operation this anesthetist supervised the nitrous oxid-oxygen anesthesias, given by his assistants, in the other operating rooms. Such service wins its own way, not only in the medicomilitary establishment but in civilian hospitals as well.

It must be remembered, however, that local and regional methods of anesthesia require intensive study and prolonged experience before they can be mastered and the successful anesthetist cannot afford to stop short of mastery. Some dentist anesthetists have already accomplished much in this direction in their special line of work and the field is wide open to the progressive anesthetist who wishes to seize the opportunity, not only in his hospital, but also in his downtown anesthesia clinic.—McM.

IN MEMORIAM.

CAPTAIN CHARLES H. GALLAGHER, M.R.C.,

U. S. Army, Base Hospital 202,

ORLEANS, FRANCE.

Captain Charles H. Gallagher, M.R.C., is the first member of the Associations of Anesthetics to give his life for his country. After a very brief siege of pneumonia he succumbed at Orleans, France, August 26, 1918, while on duty at Base Hospital 202. Captain Gallagher was born in Slaterville Springs, New York, October 6, 1876. He graduated at the Ithaca High School and later took his medical degree at Syracuse University.

Upon recommendation of the Association of Anesthetists Dr. Gallagher was commissioned in the medical reserve corps and began with a tour of duty at Ft. Oglethorpe, Ga., after which he was ordered to a replacement battalion at Allentown, Pa., later sailing for England and thence to France, where he was a member of the staff of Base Hospital 202 at Orleans, until his untimely death.

Captain Gallagher was an expert anesthestist, being a member of the American, New York and Interstate Associations, and had practiced this specialty for some time, and it is thought by his father, Dr. William G. Gallagher of Slaterville Springs, that his constitution might have been weakened by his constant administration of anesthetics. In the last letter received from Captain Gallagher he wrote that he was kept busy as patients were being brought in at the rate of about 100 a day.

Fortunately Chaplain Arthur W. Moulton has been able to give us details regarding Captain Gallagher's illness and death. He writes:

"It was my privilege to minister to Capt. Gallagher during his illness and I visited him each day. His illness was of short duration and he was unable to resist it. I had several services with him, which, he said, made him very happy. I gave him Holy Communion and was with him much of the time. He passed away peacefully without suffering. His funeral was most impressive. He had made so many friends among the French people here that they attended in large numbers and sent most beautiful flowers. The French Staff sent a large escort of soldiers and lovely bouquets. The officers here acted

CAPTAIN CHARLES H. GALLAGHER, M.R.C.,

U. S. Army, Base Hospital 202,

ORLEANS, FRANCE.

CAPT. GALLAGHER IS THE FIRST GOLDEN STAR IN THE SERVICE FLAG OF THE ASSOCIATED ANESTHETISTS.

as pallbearers and the entire body of American soldiers marched to the cemetery. The funeral service was that of the Episcopal Church and in addition there was read by one of the Captains the ritual of the Masonic Fraternity. The services were held at the Hospital and the grave. The casket was covered with a beautiful silk flag and a gorgeous Tricolor of France."

The following translation from a French newspaper of Orleans expresses the sense of loss of the foreign community that had learned to love him:

"Yesterday at 3 o'clock were held the obsequies of an American, Captain Charles H. Gallagher, M.D., attaché of Base Hospital 202. He was ill only four days with double pneumonia. The services were conducted by the Commandant, Major Bishop, and followed by a large audience. Before the tomb at the American cemetery, M. Boissin presided very devotedly at the French ceremony and spoke a few words to render homage to the deceased, who leaves a wife and two small children. Dr. Gallagher was 42 years of age. He was exceedingly kind to the wounded and sick and he seemed to reflect the animated affection which he had for his own children upon the French children who surrounded him. The words of M. Boissin deeply moved the mourners and we join with him in addressing condolence to the comrades, friends and family of Dr. Gallagher. They will find here the testimony of our gratitude and the part we take in their sorrow, which is also ours."

In a personal letter, Mr. J. D. Prigmore, American Y. M. C. A. Secretary, pays the following tribute to the deceased:

"Captain Gallagher was one of those persons we can ill afford to lose *over here just now*. It is true he had his skill and his profession and he gave himself unsparingly as a doctor; but that was only one part of his great service to us here. When the last word is spoken in the affairs of this war the biggest asset is *personality*. Captain Gallagher had the personality of giving himself to others. Officers and men alike received from him sprightliness and good cheer. The enlisted men all loved him and found him so approachable. When they had no Y. M. C. A. nor Red Cross here, he headed-up the athletics and sports for the fellows. Always his face was beaming with cheer and sunshine though driven with much work and responsibility. As supply officer, in addition to his other duties, he was much in contact with the French army and civilian officers. He was widely known and respected in this beautiful, cultured city. Many of the finest homes were open to him and the French children loved him. Remember that personality cannot die, and that that which was finest in Captain Gallagher will continue to serve and work in this hospital and communiy."

That Captain Gallagher was very popular with his fellow officers and associates is shown in Major Shearer's letter, announcing his death:

"I am writing this from the American Officers Club, where Capt. Gallagher had endeared himself to all who met him, both professionally and personally. Would that you could hear them speak of him as I have done this morning and you may be sure that his last resting place has been hallowed by the prayers and the tears of Americans and French alike. No one of us knows whose turn to be called comes next and we shall all respond as he did."

Captain Gallagher had much to give and he gave it unstintedly. A devoted husband and father, a successful practitioner, rich in friendships, a bright career in his specialty before him, he gave up much more than many men can ever give to do his part in this war for a great ideal. Now he has joined that company of brave spirits who, having subordinated all they hold most dear to their country's cause, have made in its behalf the Supreme Sacrifice. A nation that has men like these shall never die; a cause for which such men go gladly to death is bound to triumph.

The specialty of anesthesia and its Associations, which lose so heavily by his going, have a solemn pride in the thought of giving such a man to the nation. His memory will always be a precious heritage.—McM.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

INTERSTATE ASSOCIATION OF ANESTHETISTS FOURTH ANNUAL MEETING.

The Fourth Annual Meeting of the Interstate Association of Anesthetists was held in the Claypool Hotel, Indianapolis, Ind., Sept. 25-27, in conjunction with the Indiana State Medical Association.

The Executive Session was called to order by Dr. E. I. McKesson, Chairman. The minutes of the previous meeting as well as the report of the Secretary-Treasurer were accepted as read. Resolutions offering the continued support and cooperation of the Interstate Association to the Surgeon General were unanimously passed. Resolutions of condolence were passed on the untimely death of Capt. Chas. H. Gallagher, M. C., U. S. Army, representing the first golden star in the Service Flag, and conveyed to the family of the deceased.

The following were elected to membership: Drs. R. Stuart Adams, San Antonio, Texas; Geo. M. Alexander, Bronx, N. Y.; Harry R. Barclay, Dayton, O.; Denny B. Beattie, St. Joseph, Mo.; Justin W. Bourquin, Tidionte, Pa.; Leon D. Bryant, Syracuse, N. Y.; Ola Buckman, Toledo, O.; C. H. Burmeister, Cincinnati, O.; A. G. Cashbaugh, Columbus, O.; S. C. Clemans, Gloversville, N. Y.; Samuel Cohen, Cleveland, O.; M. J. Cramer, Cleveland, O.; Taylor Davidson, Sidney O.; S. Griffith Davis, Baltimore, Md.; Leo Doran, Montreal, Canada; James K. Duff, LaGrange, Ind.; H. R. Francis, Toledo, O.; M. H. Feldman, New York City, Jas. A. Flanagan, Shenandoah, Pa.; L. F. Frurip, Kendalville, Ind.; Henry J. Gibbins, Newark, N. J.; G. F. Gilliam, Moline, Kan.; Louis Greenblum, Columbus, O.; Clarence A. Hill, Buffalo, N. Y.; Walter J. Hodson, Dallas, Tex.; T. H. Hurst, Alden, Ia.; R. B. Harvey, Herrington, Kan.; H. R. Isenhower, Bloomfield, Ind.; Robt. E. Jameson, Davenport, Ia.; Marie B. Kast, Indianapolis, Ind.; Chas. B. Kelley, Jersey City, N. J.; Clyde W. Kirkland, Columbus, O.; H. Krause, Burnham, Ills.; C. A. Lambdin, Vincennes, Ind.; Iva M. Lickly, Lima, O.; Jos. E. Lumbard, New York City; Arnold J. Mackay, New York City; J. W. McHatton, Rockville, Ind.; Alex. S. McCormick, Akron, O.; James L. Meikle, Cleveland, O.; H. E. Mitchell, Lancaster, Mo.; Dee Morrow, Fond lu Lac, Wis.; Virgil B. Newell, Stafford, Kan.; Roy A. Ober, Akron, O.; Wm. W. P. Penske, Toledo, O.; John H. Reagan, Grand Island, Neb.; Olin W. Rogers, Knoxville, Tenn.; W. H. Sargent, Toledo, O.; E. E. Stewart, Akron, O.; Lamora Shuey, Toledo, O.; M. L. Townsend, Charlotte, N. C.; R. W. Weaver, McKeesport, Pa.; Pina M. Welborn, Los Angeles, Cal.; C. W. Wilkinson, Sioux City, Ia.; Julian A. Zabrocki, Chicago, Ill.; Henry F. Nolting, Indianapolis, Ind.; Bella Lewison, Erie, Pa.; Carl D. Lucas, Indianapolis, and Thomas A. Young, Toledo O.

The following officers were elected for the 1919 meeting: Drs. John J. Buettner, Syracuse, N. Y., Chairman; W. I. Jones, Columbus, O., Vice-Chairman; F. H. McMechan, Avon Lake, O., Secy.-Treasurer; and B. H. Harms, Omaha, Neb., Henry F. Becker, Danville, Ills., Geo. B. Winter, St. Louis, Mo., Louis H. Maxson, Seattle, Wash. W. F. Dramburg, Milwaukee, Wis., and Isabella C. Herb, Chicago, Ills., members of the Executive Committee.

The next place of meeting, as usual, was left to the discretion of the Executive Committee and Officers.

The following Program was presented, the papers of those in active service being read by proxy:

Address of Welcome and Presentation of Gavel, John Barnhill, M.D., Indianapolis, Ind. What the Expert Anesthetist Should Be, Alex. S. McCormick, M.D., Akron, O.; The Anesthetist on the Hospital Staff, Isabella C. Herb, M.D., Chicago, Ills.; The Downtown Anesthesia Clinic, Ralph M. Waters, M.D., Sioux City, Ia.; Organizing the Specialty of Anesthesia, F. H. McMechan, M.D., Avon Lake, O.; Anesthesia in War Surgery, C. N. Combs, M.D., Terre Haute, Ind., A. E. Guedel, M.D., Indianapolis, Ind., A. E. Rockey, Portland, Oregon, and M. L. Townsend, M.D., Charlotte, N. C.; Vapor Anesthesia for Oral and Facial Surgery, Wm. H. Long, M.D., Louisville, Ky.; Limitations and Psychic Factors of Nitrous Oxid-Oxygen Anesthesia and Handling the Obstreperous Dental Patient, W. F. Dramburg, D.D.S., Milwaukee, Wis.; Nitrous Oxid-Oxygen Anesthesia for Difficult Extractions, H. R. Francis, D.D.S., Toledo, O.; Ether Hypnosis in Psychotherapy, F. R. Starkey, M.D., Detroit, Mich.; Why Anesthetics Act, W. E. Burge, M.D., Urbana, Ills.; Some Improved Methods and Apparatus for Experimental Anesthesia, John A. Higgins, M.D., Chicago, Ills. The Physio-Pathology of Ethyl Chlorid Anesthesia, E. H. Embley, M.D., Melbourne, Australia; The Influence of Chloroform on the Stability of Red Blood Cells, E. Silberstein, M.D., Cincinnati, O.; Ether Therapy in Tuberculous Infections, W. E. Savage, M.D., Cincinnati, O.; Nitrous Oxid-Oxygen Anesthesia in Ceserean Section and Operative Obstetrics, E. I. McKesson, M.D., Toledo, O.; Cotton-Process Ether and Ether Analgesia, James H. Cotten, M.D., Toronto, Canada; Factors of Safety in Hysterectomy, Donald Guthrie, M.D., Sayre, Pa.; A Clinical Study of Blood Pressure, Pulse Pressure, and Hemoglobin in Postoperative Shock, Hemorrhage and Cardiac Dilatation, John O. Polak, Brooklyn, N. Y.; and Anesthesia in the Curriculum and Clinic, W. D. Gatch, M.D., Indianapolis, Ind.

The Annual Dinner was served on the evening of Sept. 25, was well attended and enjoyed by all. Dr. G. W. H. Kemper, a Civil War Veteran, was the speaker of the occasion and dwelt on the thread of anesthesia as it had run through his long professional life. The ladies were delightfully entertained during the meeting.

Quarterly Index

Of the Current Literature of Anesthesia and Analgesia.

Alcoholization, Direct, of Sensory Root of Fifth Nerve in Treatment of Tic Douloureaux. H. H. Martin, Savanah. Georgia State Medical Association Journal, August, 1918.

Anesthesia, General, in War Surgery. P. Picard. Presse Medicale, July 4, 1918.

Anesthesia, General, Treatment of Eight Cases of Concussion Aphasia. By L. H. S. Bholarasksha. Medical Journal Siamese Red Cross, Bangkok, April, 1918.

Anesthesia, Surgical. Henry O. Marcy, Boston, Mass. Urologic and Cutaneous Review, November, 1918.

Anesthetics, Administration of, to Soldiers. A. Mills. British Medical Journal, September 28, 1918.

Blood Changes Under General Anesthesia. L. Binet Presse Medicale, September 9, 1918.

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SURGICAL CONDITIONS IN THE GREAT WAR.*

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It is evident that it is impossible in the time allotment given by this society to consider separately and take up in detail the many absorbing interesting surgical practices that have been brought out in the great World's War. Any one caption alone, such as the treatment of compound fractures, could be exhaustively considered, the essential points like traction, wound sterilization, repair, pathology and technic of surgical intervention, easily occupying the allowance which is permitted.

It is then, the intention of the writer to take up briefly the many surgical expressions which are contingent upon the traumata and insults of war, and, indeed, to ignore the medical phenomena which may arise by virtue of a pre-existing or coincident surgical state.

The writer claims no originality or individual research whatever, he has referred freely to all medical works, journals and war contributions, paying particular attention to the French and British articles from which he has abstracted literally and liberally, in "British Medicine in the War 1914-1917", which represents the observations of scientific surgeons who have borne the heat and burden of battle for upwards of four years.

It must be recalled that a larger part of the activities of the Western Front have been carried on in a soil which for hundreds of years has undergone an intensive cultivation; this has given rise to the high prevalence of tetanus which claimed many victims in the earlier stages of the combat. Now, all wounded soldiers receive at the first dressing station—"post de secours"—an initial dose of 1500 units, are so tagged, the date recorded, and on being received into the more remote hospitals are again innoculated on the 8th day; this method has greatly reduced and practically controls the mortality from lockjaw. Only rarely is a fatal case seen which is apt to be associated with some other serious surgical state, which in itself has worked havoc in a body worn by the constant vigil of war, and is irresponsive to the antitoxin.

Your writer had the occasion of operating at a well equipped surgical hospital on the Western Front, about 30 miles north of Paris, for six months in 1916, and of witnessing the wounds of high explosives, and in 1917 the opportunity of visiting more than thirty surgical hospitals on the Eastern Front, which had been organized, equipped and manned by Roumanian and French surgeons for the care of the Roumanian and Russian soldiers.

The anatomy of the human body is the same, regardless of creed or color; the pathology of wounds must follow the same biologic laws; and reparation must be guided with the same skill and minuteness, to assure a happy outcome, regardless of the phylogeny of man.

For many years to come there will be numberless volumes written on the "Surgery of War", "Traumatic Surgery," etc., etc. Carrel and Dakin's pioneer contribution on wound sterilization revolutionized the surgical world some two years ago. In skillful, efficient hands it has proven most valuable and is the last word in scientific reparation. Your writer had the pleasure in 1916 of visiting Dr. Carrel's hospital, Rond Royal, Compiegne, and witnessed with much interest and benefit the exact means by which the Dakin Solution was used. The location of this hospital so near the front was favorable, in that the patients were received in from one to six hours after their injury. This early reception obtained in but few of the many hospitals. On admission *x*-ray examinations are carefully made and, with the plate as a guide, foreign bodies are located, their size noted, and operation undertaken. The incision, or incisions, are generous and of sufficient size to give full access to all foreign material, cloth, shreds, fragmented bone, or to an injured viscus. It would be well to note the clothing of the soldier for holes and loss of cloth which may be later located in the wound. The wound is gently, but thoroughly, cleansed of devitalized tissue and foreign bodies; comminuted bone particles devoid of periosteal attachments are taken away, but no fragmented piece of bone is removed that possesses a periosteal bridge; small pockets and pendent cavities must be given free drainage, and counter openings made if necessary; hemostasis should be perfected; gentleness, thoroughness, and complete wound eversion should be adopted in every case. The establishment of continuity of a severed nerve may be attempted at this time, usually, however, this operation is deferred to a later date. There is no attempt to remove minute particles of shell or stone which the *x*-ray may show to be dotting the plate. The crushed bone is placed in proper alignment, an appropriate splint applied, and the Carrel solution is now directed to every square centimeter of the wound surface by means of tubes, which are perforated with many holes, tied at the end, and enveloped in Turkish toweling. I have seen as many as 25 tubes used in one case. It is not the intention to use the solution as a means of irrigation, but by simple contact. The tubes also act in a measure for drainage tubes. There is no attempt to close the wound. Gauze wet with the Dakin's solution is applied to the raw surface only, the skin surface being protected by yellow vaseline, because it has been noticed that this preparation may produce considerable irritation to the skin. Carrel's solution is simply hypochlorite of soda and must not be stronger than 45/100 to 50/100 of 1 per cent. Probably the nascent chlorine, or the production and liberation of chloramines is the property which exercises the beneficial effect. There is no super-saturation there is no overflow of the fluid from the wound, the linen and the bed is never soiled. If there is any excess it is attracted into the dressings.

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*To have been read at the meeting of the Medical Society of Virginia in Richmond, October 23d, which meeting was postponed on account of the epidemic of influenza.

Frequent microscopic examinations are made to note the progress of the wound. Smears are made by means of a platinum needle, are fixed in the flame, stained and examined. When one germ is found to four fields under magnification of an oil immersion lens the wound is considered to be ready to be sewed up. This usually obtains in from four to six days. In bad compound, comminuted fractures, with much loss of tissue, it may take from ten to twelve days. The wounds are dressed every day, new tubes and gauze applied. The flow of the solution must be stopped four hours before the microscopic investigation, as its antiseptic properties may misrepresent the result. The character of the germ found upon investigation carries no individual significance whether it is staphylococcus, streptococcus, gas bacillus, or any other germ. It is the number and not the variety to which importance is attached. One feature in particular illustrated the precise and exact extent to which the knowledge of wound healing had been carried. An instrument placed about the wound measured off accurately the square centimeters of devastation and by a mathematical formula it could then be definitely and positively predicted when the wound would heal. In the few failures recorded, a foreign body, or a piece of cloth, which had escaped the *x*-ray, would be found, this removed, new calculations made and the repair would be completed on schedule time. The depth of the wound, bone involvement and tissue loss has no bearing on the reckoning. In but few hospitals was the ultra-scientific method carried out properly, the result being that the solution was given up and the old standard textbook, boric, bichloride, Theirsch, Ménière's solution, Dichloramine-T, Rutherford Morrison's B.I.-P. (bismuth, iodoform, liquid petrolatum), gentian violet, magnesium sulphate, iodine, Sir Almroth Wright's methylene blue, hypertonic salt solution, Eusol, peroxide, flavine and numberless others would be inaugurated, each hospital claiming the superiorty of one, but none, probably, being in great popularity over a few weeks or months.

It has been given out recently by some surgeons returning from the zone that a new method of wound sterilization is being adopted, based on the wide, aseptic and clean enucleation of all the tissues involved by a surgical operation. I do not understand how this would be applicable to the devastating wounds of the shoulder or knee in which there has been a considerable involvement of the bony structures.

It should be recalled that the character of the uniform has a decided bearing on the wound response; formerly the gray-blue clothes of the French were of a very inferior quality, large fragments would be carried ahead into the tissues by the missile and unrecognized by the *x*-ray, be a source of infection and suppuration until removed. I believe that in the Russo-Japanese War the warriors from Nippon were enjoined to bathe freely and change the underclothes before entering into battle; statistics bear out the wisdom of this cleanliness.

With the advent of young America into the war there was a spontaneous rejuvenation of the war-wearied Allied Forces, and through the ranks of the front line trenches rang the slogan "America is here". The best of the medical talent available in the United States had volunteered, men of international reputation; supplies, paraphernalia and armamentaria for the surgical and medical care of every known injury and disease were soon to be found in all the hospitals; organization is daily being perfected; but with an army advancing or retreating the necessary supplies and assistance must of necessity be at times delayed or not forthcoming.

ANESTHETICS.

Captain Geoffrey Marshall, R.A.M.C.S.R., states that the division is best accomplished by three classes:

I. *The lightly wounded.* These are good subjects for the gas oxygen, which is preferred in such instances, but when not available ether is used. Local anesthesia being used in only a small number of cases.

II. *The seriously wounded,* attended with shock. Spinal anesthesia has been urged for all injuries of the legs and thighs. In practice it has been noticed that when this preparation is used in open wounds it is attended with further shock, pallor, vomiting, occasionally convulsions and death. Dr. Jonnesco, of Bucharest, has used spinal anesthesia in 8,000 cases with no fatality. I had the opportunity of witnessing him operate at the St. Spiridon Hospital at Jassy, Roumania, a considerable number of times last summer, in which he used the intra-thecal method from as high as the second cervical vertebra down. Tumors of the thyroid, foreign bodies of the scalp, radical mastoids and other cranial and cervical operations were carried out by this intra-spinal anesthesia. No other anesthetic was used on the Eastern Front but this spinal injection, it being employed in every hospital, under every condition, with apparently uniformly good results. It must be noted that the specific gravity of the fluid as prepared by Jonnesco is different from that of Babcock in this country, the patient not having to be inverted to prevent its ascendency from the point of insertion. In a series of many hundred cases witnessed in visiting some thirty odd hospitals I never saw a general anesthetic administered. This may have been because the Roumanians were unable to secure either chloroform or ether. All cases in profound shock should be supplied hot water bottles or hot air bath before being operated upon. Morphine is given generously, and preferably gas-oxygen administered by an expert gently and soothingly.

III. *Those suffering from a serious degree of sepsis, especially the anaërobic infection.* It has been well demonstrated that one suffering from sepsis will stand a capital operation such as amputation much better than one who is suffering from shock. It is recommended in these cases that gas-oxygen be the choice. Spinal anesthesia, warm ether vapor, and intravenous ether are also recognized as being comparatively safe. Chloroform should at all times be avoided.

SHOCK.

The writer will attempt no definition or pathology of this condition. Shortly after my visit to Dr. Carrel, in August 1916, his hospital at Compiegne was to be closed since he considered at that time that the theory and practice of wound sterilization had been so perfected that he could confidently hand his developments over to the medical profession, and he was then to go to the front, where he could come into immediate contact with those suffering from wounds and shock. We have never heard the result of his investigations. To all surgeons, the dusky pallor, with flickering, wavering pulse, lowered surface temperature, dilated pupils, sweat and repeated vomiting, consciousness until within a few minutes of death, is a well recognized train which portends a profound state known as shock. A systolic pressure lower than 80 mm. by the Riva-Rocci sphygmomanometer indicates a questionable outcome. The treatment of the condition must be immediate, the application of external heat by electric lights, improvised hot air bath, hot water bottles, blankets and stimulants. An arterial blood pressure which continues to rise for several hours is favorably recognized. Fluids are best given either by mouth or rectum. The Murphy continuous drip, with morphine, and the elevation of the foot of the bed are the well-known hospital combatants for this unknown surgical state. Intravenous administration of fluids is not so happy in its outcome on account of the lowered arterial and venous flow. Transfusion of blood is probably the best of all methods, but fresh blood is at a premium among shrapnelled soldiers. At present there is an investigation of the use of artificial viscous fluids being carried on without any marked benefit being noted.

Deaver in Annals of Surgery, Vol. LXIII, calls attention to the difficulty of differentiation between shock and hemorrhage. He says, "the leucocyte count which is increased in hemorrhage is not apt to be affected by shock," but much depends on the intuition of the experienced surgeon who, more often than not makes the differentiation correctly.

BURNS.

Burns from explosives, sapping and gasoline are treated as in civil practice. A product brought out by the French, "Ambrine", is a gentle protectant, with paraffine as its base, which is melted and then sprayed by an atomizer over the surface after the wound has been surgically cleansed and the field prepared.

TRENCH FOOT.

Trench foot is really a minor degree of frostbite. Lorraine Smith has shown that the primary lesion is vascular, with a secondary inflammatory reaction, the only difference between this condition and true frost-bite is one of degree, the severe forms ending in gangrene. Professor Delphine emphasizes the importance of a layer of air about the lower extremity in preventing trench foot and has devised a light oil silk bag that can be worn by those in the continuous slush and mud of the trenches.

GAS GANGRENE.

There are two types: 1. "gaseous cellulitis" and 2. "massive gas gangrene". The former term was used in the milder cases in which the cellular tissue about the wound was considered to be the primary seat of the disease, the latter term to those cases in which the whole limb was rapidly involved, the patient dying. The former type was treated by multiple incisions and drainage and the latter by amputation. From a clinical point of view it was found that the conditions that favored the onset of the disease were: (a) The retention of extravasated blood and wound secretions, (b) interference with the circulation, (c) the presence of large masses of partially devitalized or dead tissue, (d) extensive comminution of long bones, (e) the presence of particles of clothing in the depth of the wound. It was noted that dressing which dried and caked, predisposed to the infection so that the dry wool and gauze of the English surgeons was abandoned for a light moist dressing that encouraged the discharge of blood and serum. Likewise interference with the circulation predisposed to infection of the gas bacillus. The tourniquet could not be dispensed with in every instance; in those cases when it was necessary the patient was taken with all haste to an advanced station that the hemorrhage might be stopped. Circular bandages also retard circulation, particularly when applied over comprehensive gauze dressings. In compound fracture fixation of the limb must be carried out; Thomas or Lister splints answer these demands.

Thrombosis, or rupture of an artery involves a most delicate surgical procedure which cannot be undertaken without every perquisite. Tuffier's tube to restore the circulation and Bernheim's canula have been tried with varying success.

The devitalized tissue that produced a nidus for the development of the gas producing organism must be gotten rid of by excision through the opened wound. This has greatly improved the end results.

The bacteriology is interesting, for it has been established that the number of gas producing organisms steadily decreased with the lapse of time, while the pus producing organisms increased. This bacteriological fact substantiates the clinical observations that the likelihood of gangrene occurring became steadily less as the wound got older and suppuration more established.

I had the pleasure of meeting Dr. Kenneth Taylor, a member of an American ambulance at Ris Orangis near Paris, which hospital was under the personal supervision of Dr. Jos. A. Blake. Dr. Taylor states that he believes that the trouble is essentially a disease of the muscles. Some clinical observers working in the British army have supported this view. It was found that gas gangrene seldom produced serious symptoms unless the muscle was infected, and that the muscles might be killed and gaseous while the intermuscular planes remained little altered. It was also pointed out that single muscles and muscle groups were very apt to be picked out while others remained healthy. It was noticed that invaded muscles were nearly always muscles that had been wounded. The disease would spread up and down these, but showed little disposition to pass to this uninjured fellows. Advantage was taken of these facts to excise those muscles affected, and thus arrest the disease without recourse to amputation.

It was further recognized that crepitations and color changes in the skin might be comparatively late manifestations of the disease, and that death of the muscles might take place before these signs were evident. It became apparent that the discoloration of the skin was due to arrest of the blood supply, brought about by the death of the underlying muscles, and that crepitation was largely due to a forcing out of the gas generated in the muscles into the intermuscular planes and subcutaneous tissue, and that the crepitation in the muscle was really a very late stage in the process of disintegration.

If it is accepted that this disease is mainly one of muscle, some measure of explanation is afforded. The question still remains, why do some muscle wounds lead to gas gangrene and others not?

Most observers believed that the organisms could only live in dead muscle. In every wound there is dead muscle; but if the diseased condition should spread, the organism, on the assumption that the bacillus could only live in dead muscle, must be able to kill the muscle.

D'Este Emery, who had been impressed with the repeated return of the disease in amputation stumps and its rapid spread, in a most suggestive paper showed that the poison produced by the B. aërogenes capsulatus had a powerful negative chemotaxic influence on the leucocytes. These experiments performed in vitro were in strict consonance with the histological observation that there is no leucocytosis when gas gangrene is active, and that the leucocytes only appear when the disease is in the process of arrest.

McNee and Dunn have offered the following explanation:

The bacteria which are responsible for the causation of gas gangrene lead their normal existence as saprophytes in decaying organic material. When these organisms obtain access to the tissues which have already been devitalized by loss of blood, they find an environment entirely suited to their growth, and proliferating readily, they produce gas and liquefaction of the tissues. This process is simply the uncontested invasion of dead material by bacteria, and it is entirely similar to what may occur in the whole body after death. The organisms most frequently are unable to establish themselves in the healthy, undamaged tissues, and are soon destroyed by phagocytic action. The progressive death of the muscle permits further luxuriant growth of the organisms and extension of their lethal effects. The sugar content of the muscle is favorable to the growth of the anaërobics, and the result is the production of a highly toxic fluid.

When gangrene appears in the muscles, or muscle groups actually wounded, the treatment depends on the condition of the patient. If this is good, the wounds are freely opened and the affected muscles or muscle groups removed. The test employed to distinguish dead from healthy muscle is the want of contractility or the presence of the brick-red color.

Even with the gangrene localized to certain muscles, amputation is the safest course, if the condition is bad, and it is seldom possible to save such a limb if the bone is broken.

WOUNDS OF THE HEART.

There has been one successful suture of a heart wound. It was performed by Capt. John Fraser. The details are as follows: A bomb fragment entered immediately internal to the left nipple. There was a persistent and pulsing escape of rather dark blood. A probe passed upwards and towards the mid line evidenced a cardiac rhythm. The pulse was small and irregular; the patient distressed and cyanosed. A portion of the fifth rib and its cartilage was removed, and the fourth costal cartilage detached from the sternum. The pleura and fat were retracted, and the pericardium incised. The latter contained a quantity of dark blood. A small hole the size of a pea was found in the right auricle. By a suture the auricle was pulled up into the wound and the hole closed by two linen sutures. The progress was good and the pulse, which had been 120 dropped to 90 on the fourth day.

The patient nine months later reports his health excellent.

WOUNDS OF THE BLOOD VESSELS.

It may, in the first place, be noted that the conception of many surgeons of the size of the lumen and of the thickness of the wall of the arteries in general has undergone a change in this war, and it has often been remarked by medical officers that the arteries are smaller and have slighter walls than was expected.

Lateral sutures of both veins and arteries has been done in a fair number of cases, and in two instances a lateral rent in the vena cava itself has been closed, although the only successful case was one in which the sides were brought together by artery forceps and not by suture. The opportunity of end-to-end suture of arteries has rarely offered itself at the front, and as far as the writers know has only been even temporarily successful in one case, that of a bullet wound of the brachial artery; and this vessel gave way and formed an aneurysm some three weeks later. In a few cases the femoral artery has been sutured, but in no case has the operation saved both the limb and the patient.

Even in the popliteal space, where some approximation of the arterial ends can be obtained by flexion of the knee, no case has yet occurred in which arteriorhaphy has seemed feasible while small wounds of the limbs or neck with an arterial hematoma seem hardly suitable for this method of treatment.

It is under these circumstances that "Tuffier's tubes" offered some hope of saving the limbs from gangrene when arterial suture was out of the question. They have been employed at the front on many occasions, and are, it is believed, well worth trying; although they become blocked within twenty-four hours, they have appeared to tide a limb over this most critical period before the establishment of the collateral circulation. In one case it was noticed that the tube itself remained unblocked although the artery below became obstructed by a clot, and it may be that this distal clotting in the artery will always be a difficulty in practical as opposed to experimental surgery. It must be remembered that in actual practice the limb below the lesion has been deprived of blood for some time before the opportunity occurs of inserting a tube and re-establishing the circulation, and it may be that this period of starvation produces changes in the vessel walls that favor clotting.

In civil practice, after the interruption of the main blood supply of a limb and the consequent occurrence of gangrene in its lower part, one looks for and sees the formation of a definite line of demarcation. But in the present campaign it has been found that, after the destruction and ligation of an artery, this line of demarcation fails to appear in the majority of cases, and the seat of the amputation has to be chosen by noting the place where the limb becomes cold and discolored, or where the capillary circulation is still active as shown by the return of the skin blush after pressure.

It is a fact at once curious and important that the arrest of the blood current at a point that is considered a favorable one for the application of a ligature in civil practice is often followed by gangrene when the arrest is caused by a gunshot wound. Wounds of certain arteries stand out as especially dangerous to the vitality of the limb, notably those of the popliteal and the anterior and posterior tibial vessels.

INJURIES OF JOINTS.

In the early days two lines of treatment were followed. The small perforating wounds were left alone and allowed to heal, the progress of the joint being tested by aspirations if necessary. The larger wounds with escape of synovia or actual laying open of the synovial sac were drained, and at first the drains were often introduced into the joint cavity. The results of this treatment were undeniably bad, and all sorts of heroic measures were adopted for the arrest of the septic process which ensued. But continuous irrigation with an acute flexion of a widely opened articulation gave equally poor results, and the patient was lucky if he escaped with a stiff leg.

The first improvement was the abandonment of the intra-articular drains. The next was the excision of the wound, the removal of any foreign body, the flushing of the joint, and in some cases the closure of the capsule and the insertion of a superficial drain. Closure was especially advocated by Colonel Gray in the year 1915.

The next step was perhaps a bold one. As soon as possible after the receipt of the injury—that is, in the casualty clearing station—the wound was excised, the joint opened, cleaned, and irrigated, and then the whole wound in the synovial sac and the superficial tissues was tightly closed. It was certainly astonishing how seldom infection followed such treatment, even when fragment of shell or pieces of clothing had been removed from the joint; but for its success it is essential that the incision around the wound edges should be carried quite clear of all infected tissue, and that the strictest asepsis is assured.

Guillotining the articular ends of the bones in joint involvement is another method which has fallen in disuse, it offered only an irremediable stiff joint and possibly repeated operations.

Now, every knee-joint with such a wound is given the chance of healing by first intention, although the closure of the joint defect may entail the performance of a plastic operation to provide an adequate cover with a flap of synovial membrane or skin. Even if some infection does follow the closure of the joint, it is well not to be in too great hurry to lay the articulation open, for a certain number of such joints do settle down and provide a better limb than if submitted to more active treatment.

When the joint wound is complicated with fracture of bone it may still be possible in some cases to close it with success. In cases of compound fracture of the patella with loss of substance, partial or complete removal of the fragments and the provision of a skin flap, will often be followed by primary healing.

When the tibia or femur are involved the case becomes more serious, of the two fractures that of the tibia is the more to be feared.

In cases of only partial loss of the articular surface of either the tibia or femur, and also in the linear oblique fractures of both bones running up into the joint it is often worth while to try to close the joint and to obtain primary union.

When there is much comminution of bone, however, and a dirty wound, it is better to abandon all hope of saving the joint and perform a limited primary excision. After such an operation the joint surfaces are usually kept apart by extension on a suitable splint, and Carrel's treatment adopted until the wound cleans, when the bone surfaces may be allowed to come into contact.

The knee is the only joint in the body in which penetration of the synovial sac is at all commonly seen without damage to the bony constituents of the articulation. It is therefore not common to have the opportunity of closing other joints, but the opportunity should be taken when it is offered.

More often the surgeon has to treat a greatly disorganized articulation, and in such cases a primary excision is most probably the best course, especially in the cases of the shoulder and the elbow.

1. Fixation of a suitable splint. In the case of the knee this splint should be one of the varieties of the "Thomas" as used for fractured thigh.

2. Beyond this treatment nothing more is required in simple perforating wounds.
3. The taking of an x-ray picture in cases where there is a possibility of the retention of a missile or of fracture of the bones.
4. The excising and cleansing of the damaged tissue and the exploration and lavage of the joint.
5. The closure, if possible, of the joint cavity.

HEAD INJURIES.

Advantage was taken of the fact that a head case before operation travelled well, and the special hospitals were placed in the back part of an army area. These hospitals were never subjected to the sudden pressure that may fall on an advanced casualty station, and consequently the cases could remain there for a long time. By this means patients experienced the advantages both of early operation and prolonged rest. The actual method of evacuation is as follows: The patients are brought from the trenches to the casualty clearing station as rapidly as possible. Here they are examined and dressed. If the pulse is rapid they are put to bed and evacuated later, should they improve. No special attention is paid to the type of wound—reliance is placed on the slow pulse as a sign that the patient will bear the injury.

It has been found that the removal of bone sufficient to expose half an inch square of injured dura is best suited to most cases. Opinions still differ, perhaps, as to the comparative merits of making a flap or enlarging the scalp wound. On the whole the flap is the best as a routine, unless the wound, as in the case of a horizontal one, is so situated as to compel the use of a very large one.

The recognition of the fact that a slow pulse is not necessarily a symptom of compression (for it may occur with a wide exposure of the brain), and that the symptoms, paralytic and otherwise, are not due to the depression of fragment but to a destruction, or commotion of the brain matter which is not remediable by operation, has also had an effect opon operative procedure. In the first place a slow pulse is welcomed as a sign that recovery may follow, and it is not taken as a sign that operation is urgently needed, but rather that it is worth doing. The recognition that depression of fragments is not the usual cause of the symptoms has also done away with the notion that their removal must be immediately undertaken.

Colonel Sargent has pointed out that for at least twenty-four hours after injury the brain is liable to be edematous, and to extrude unduly if operated on while in this condition. A moderate delay has also been said to be helpful in that it allows adhesions to form between the dura and the pia mater, thus lessening the chance of a spread of infection over the brain surface.

An x-ray had become a necessity, and the opinion was gradually formed that a limited and intelligent search for bony fragments and other foreign bodies was beneficial, but that attempts to reach a missile which was deeply embedded in the brain were not justifiable. Results seemingly have proved the correctness of this line of treatment, for fragments of shell are reported to have caused little trouble, provided their weight was not enough to cause pressure on the surrounding brain during movements of the patient.

A drain introduced under the scalp is still generally employed.

Most surgeons have accepted the recommendations of Sargent and Gordon Holmes that depressed fractures over the longitudinal sinuses should be left alone in the first instance.

Most operators are of the opinion that the dura mater should not be opened if found intact. The recognition that true compression of the brain is seldom seen has helped the formation of this opinion.

A brief recapitulation of the treatment would be: A primary cleansing of the wound. The transmission of the patient as soon as possible to the hospital where he will convalesce. The taking of x-ray pictures. The incision of the scalp and bone wound. A limited and careful removal of foreign bodies. The covering of the exposed brain. The closure of the wound, with superficial drainage, and a prolonged rest in bed.

ABDOMINAL WOUNDS.

Nine abdominal wounds means roughly about 600 wounded men, taking a moderate estimate of the proportion of abdominal wounds to total wounds.

The statistics of the South African campaign are very defective. Surgeon General Stevenson in the official history of the war was only able to collect 207 cases of abdominal wounds. Among them it is stated that there were 26 laparotomies with 18 deaths, a mortality of 69.2 per cent, and according to Stevenson the mortality was really even worse. The total death-rate of all abdominal wounds quoted—operated and unoperated—is given as 30.4 per cent.

It is no longer a question of whether a man could be operated upon, but whether he should be operated upon. The customary procedure was to put the man in the Fowler position, to improve the general condition by rest and warmth, to withhold food and water for three days and to administer morphine. The thirst, which was a distressing symptom of this treatment, was combated to a certain degree by rectal salines and mouth washes.

In May, 1915, an inquiry into the causes of death after abdominal wounds established the following facts:

1. That the injuries were as a rule of such a nature that recovery must be a very rare event.
2. That hemorrhage was a chief cause of early death.
3. That bullets produced very extensive injuries.

The British practice has been to operate a short distance behind the line.

A certain number of cases of rupture of a hollow viscus without abdominal penetration have occurred, and have made it advisable to explore the intestines in some instances even when the whole thickness of the abdominal wall was not penetrated by the missile, but where the symptoms have pointed to the probability of a lesion of one of the hollow viscera. The practice is now to operate on all cases unless there is some reason to the contrary, and to operate on principle rather than on the indication by symptoms. Celerity is of great importance. The body heat must be preserved in every way. There should be the least possible exposure of the viscera, and the intestines should be kept inside the abdomen as much as is compatible with the necessary manipulation. The least possible should be done. All the intestines should be examined. Suture of the intestine should always be preferred to resection unless the latter is inevitable, or saves time, and experience has shown that a single continuous suture, applied so as to invert the peritoneum, is quite sufficient and perfectly secure. Linen thread or thin silk are both preferable to catgut, and care is required not to draw the stitches too tight. If resection is unavoidable, end to end anastamosis is preferable to lateral apposition as a rule.

Solid organs should be disturbed as little as possible, unless vessels have been opened. Excision of spleen and kidney should be practised with great reserve.

Through-and-through wounds of the liver are best left alone, but if the *x*-rays show a large piece of shell or bomb in an accessible position it should be removed, for if left it generally causes dangerous sepsis in the organ.

Abdominal drainage is most probably of little use except in local lesions.

Artificial ani in the colon are to be avoided if possible.

At the Eastern Front with the Roumanian army all abdominal cases except evisceration were treated expectantly, this may have been due to the insufficient frontal hospitals and adequate means for transportation of the wounded.

THORACIC WOUNDS.

The number of chest wounds admitted to the clearing station is about 2 per cent of the whole number of wounds admitted. The most favorable cases are those in which a bullet has gone right through the chest.

In cases where the missile has involved both the chest and the abdomen the prognosis is very unfavorable. Occasionally the whole stomach, or part of the intestine, is drawn up into the pleura through a wound of the diaphragm. In other cases the abdominal viscera are so injured as to prevent recovery. In any case the addition of a wound of these organs to the temporary loss of the use of one lung, which is the usual result of a wound of the chest, produces a condition from which very few recover. Injury to the spinal cord is a still more fatal complication.

There is often much distress if the external wound admits the free entry and exit of air in respiration. It is almost at once relieved if the wound be made air-tight with strappings over the dressing. After careful paring of the wound, removal of loose bone, and blunting of sharp edges, the skin and, where possible, the muscles are drawn together and stitched over the aperture, leaving either only a small hole for the drainage tube or none.

General Antonin, commanding medical officer of the 2nd Roumanian army, gave me an article representing the consensus of the Roumanian surgical opinion in the treatment of thoracic wounds; it practically substantiates the British records. In one ward in Bacau (Roumania) there were 28 cases of thoracic injury, all were getting well, none had been operated on, although aspiration had been repeatedly carried out in several instances.

FRACTURES.

(a) The cleansing of the wound, (b) the setting or reduction of the fracture, followed by its maintenance in good position.

The organisms that infect a compound fracture may be roughly divided into: (a) anaërobic or gas gangrene producing: (b) pus producing organisms.

The development of the operative side of the casualty clearing station and the provision of *x*-ray have been of inestimable benefit to the patient. There can be no doubt that the chance of the patient recovering with a good limb and of escaping a long period of suppuration depends on the attention that can be paid to his wound in the first instance. No amount of after-care can ever make up for the want of it at the first moment. A thorough and deliberate operation is all-important. There must be a free opening; the cavity must be explored by the eye, as well as by the finger, otherwise dead tissue and possibly foreign bodies will be passed over.

The early, deliberate and efficient cleansing of the wound is the basis of success, no matter what chemicals are used after the operation has been scientifically carried out.

VOCATIONAL TRAINING AND EDUCATIONAL THERAPHY.

The writer presumes to predict that the Government will adopt measures by which those soldiers who have lost arms, legs or eyesight will be educated along lines designed to develop their remaining powers so that a livelihood may be maintained in jobs which will be held open for those cripples. Men with only *one arm* can be ticket choppers, ushers, carriers, collectors, elevator-attendants, planters; with only *one leg*: clerks, accountants, book-keepers, ticket-sellers, chauffeurs (with the machine properly adjusted) locomotive engineers, pilots, machinists, carpenters, brick layers. The blind require greater attention and educational development. Basket making and carpentering, chair making, the making of tubs, vats, rugs and mats, shoes, sailmaking, wood working, the designing, manufacture and production of toys, dolls, wagons, etc., musicians, piano-tuners, telegraphers, telephone operators represent possible occupations for those with impaired or lost vision.

J. Gourdon, Bulletin de l'Academie de Medecine, states that in observation of 5,014 maimed soldiers with grave and incurable lesions 73% resumed their former occupation with or without prostheses, 27% requiring vocational training. About 30% were crippled in the arms.

He further states "War cripples seem to lack the will power more than others, and they tire more readily." Persons accustomed to till the soil formed 62 per cent of the total, and they return to farm work more readily than others. Fully 85 per cent of the farmers and 48 per cent of the farm hands spontaneously returned to farm work after being supplied with prostheses for the purpose. The loss of an arm does not incapacitate more than 25 per cent, and disarticulation of the shoulder not more than 50 per cent. Amputation at the thigh causes about 50 per cent incapacity. The incapacity from loss of a leg is not over 10 per cent in industrial work.

One thing is certain, this being our country, and our own flesh and blood having been sacrificed for right and honor, it is up to us who have stayed at home to do all we can and more for our maimed heroes returning from the battle line.

Grace Hospital, Richmond, Va.

DEAD TEETH.[1]

JOSEF NOVITZKY, D.D.S.
SAN FRANCISCO, CALIFORNIA.

It is not strange that medical and dental diagnosticians have not reached a very definite understanding as to whether, "after the usual attention by the average dental practitioner, there still remains in and about the teeth infection sufficient to induce a focal area, with eventual serious consequences to the entire body." For medical diagnosticians, in spite of such striking exceptions as William Hunter, M.D., F.R.C.P., have tended to leave everything regarding the teeth in the hands of dentists. And dentists worthy of the name of oral diagnosticians are few and far between. The average dental practitioner has had little knowledge of pathology. What was taught him in dental colleges concerning septic conditions of teeth and jaws was in many cases wrong. On this wrong foundation the average dentist would build up a life-long practice of incorrect treatment. At the present time, however, physicians, and some dentists, especially on the Pacific coast, are not disregarding the teeth as possible sources of dangerous infections; and the main problem of dentists has become that of septic teeth and jaws.

During the past few years I have stated very positively on several occasions that all devitalized teeth are dead teeth and subject to the laws of infection and putrefaction. This has been stated not as my opinion but as the inevitable conclusion drawn from the careful pathological examinations of hundreds of devitalized teeth. Of these hundreds of devitalized teeth, there was not one which, six months after devitalization, did not show unmistakable evidence of infection.

Nevertheless, the results of such careful pathological examinations have not been accepted. There are still leaders of the dental profession who definitely express the opinion that a devitalized tooth may be retained in the jaw and aseptically filled "with no post-operative periapical infection." It is claimed that Roentgen ray examinations and cultural tests will establish this opinion as a fact. But I have failed to find any statement to the effect that any one properly conducting cultural tests, six months after tooth pulp devitalization, did actually establish the lack of infection as a fact.

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[1] Histological work done in the Laboratories of Surgical Pathology of Leland Stanford, Jr., University Medical College.

The presence or absence of septic areas is not a thing to be determined by opinion or arguments upon theory. We have here a clear question capable of being decided by arguments of fact.

The answer to the question whether a devitalized tooth can be retained in a permanently sterile condition in the mouth depends on whether a devitalized tooth is dead. Physicians and dentists are willing to grant that when a tooth is dead, it cannot be retained permanently sterile in the mouth. But they are not yet willing to grant unanimously that a tooth is dead when it is devitalized. Many of them still hold, that after the pulp is removed, a tooth may retain vitality, may receive nourishment, and may be capable of growth.

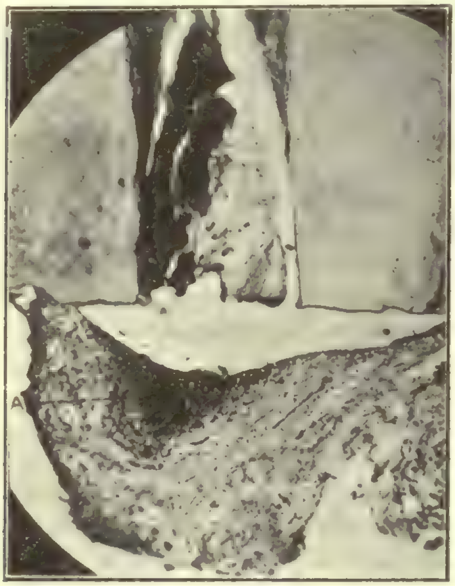

Plate 1.
Photo micrograph by Dr. F. E. Blaisdell.

This attitude is due to the confusion between what is and what is desired, to the conflicting statements of dental histologists cited as authorities, and to the dependence on authorities, theories, and opinions instead of on scientific facts established by observation and experiment.

If then we can prove that a devitalized tooth lacks vitality and is incapable of receiving nourishment, we must conclude that a devitalized tooth is dead and hence cannot be retained without infection. And we may confirm our conclusions by Roentgen ray examinations and cultural tests.

When the dental pulp has been removed and the apical foramen closed, the only possible nourishment to the tooth would be by means of or through the cementum which surrounds the root. On the possibility of such nourishment hangs the whole tale.

Dr. Grieves writes, "While there has been no proven communication through the first cemental lamina which is quite dense, the nearest vital cells, the cementoblasts in the second lamina, suggest from the trend of canaliculi, which is only in the direction of pulp and peridental membrane that some osmosis of tissue juices must exist from pulp to membrane, in fact any other condition is biologically inconceivable." And he quotes from Hopewell-Smith the statement of Tomes (incorrectly cited as "Tome") in support of this view. In the quotation,[2] he omits Tomes' word "pulp" after "tooth" in the 4th line; and he fails to indicate that Hopewell-Smith "entirely disagrees" with the quoted view. Moreover, Dr. Grieves indicates that leading histologists have adopted the view of Tomes. I maintain that not a single one of the leading histologists have adopted Tomes' view. This acknowledgement in the quotation of a lack of proof is strange in the face of such positive assertions as,

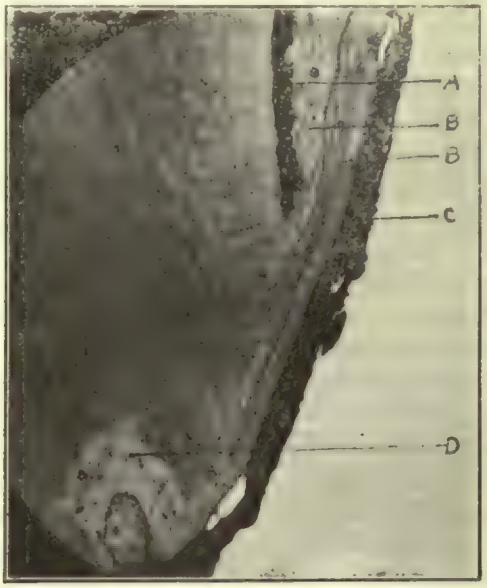

Plate 2.
Photo micrograph by Dr. F. E. Blaisdell.

"So soon as the dentist's instruments passes through the epithelial protection, sometimes even before, into cell-lymph spaces or by the dento-enamel junction, into the granular layer of Tome, he is in slow but sure absorptive contact with the blood stream."

"Sufficient evidence has now been presented to establish, as the very first consideration, the vitality of the apical cementum which must not be destroyed in pulp devitalization."

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[2] Journal National Dental Association—August, 1918. Page 782.

There is no evidence in support of Dr. Grieves' opinion, which seems to be influenced by the statement of Tomes. And a further reading of Tomes would disclose statements contradicting the quoted view, as, "Vascular canals corresponding to the Haversian canals of bone are met with but it is only in thick cementum that they exist; and, in man, perhaps in exostosis more often than in the thick healthy tissue."[3]

Better authority than Tomes are Hopewell-Smith, Noyes and Black, all of whom present sufficient evidence to prove that the human tooth is not kept vital by the cementum.

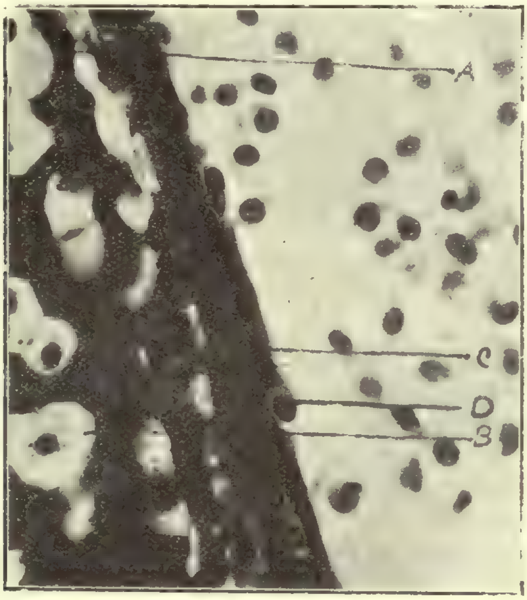

Plate 3.
From the collection of Dr. F. E. Blaisdell.

If in examination, opossums' teeth had been substituted for human teeth, Dr. Grieves' view could then be given the semblance of truth, but under this condition only.

Right now the main point is that we must not depend on the view of any one of several conflicting authorities. The value of our work will depend on the degree in which we introduce evidence that will warrant definite conclusions.

The theory that a tooth receives nourishment by means of or through the cementum is very attractive; but Noyes, Black, Hopewell-Smith, and others have rejected this theory by their repeated statements that normal cementum is structureless. The lack of structure in normal cementum has been corroborated by my own laboratory investigations in surgical pathology.

My own investigations with specimens secured by grinding, decalcified paraffin sections for oil immersion, and decalcified celloidin sections show clearly that cementum in normal thin layers from the teeth of man is structureless. There is no way for blood vessels or blood to pass from joint to pulp or vice versa except by way of the apical foramen. According to Dr. Southwell of Milwaukee, when fluids were sealed in the pulp chamber of an extracted tooth and the tooth then placed in another liquid, there was no trace of fluid diffusion unless the cementum had been removed; attempts to force compressed air through the lateral root walls also failed.[4]

Excess of cementum due to septic or other irritation is generally lacunated. A beautiful example of this is a tooth which had been extracted, boiled, and replanted by me. Two years later the tooth was removed by dissection. Histological study of celloidin sections showed numerous lacunae and thick layers of young cementum.

Plate 4.

Septic dentine appears to cause in some way an excessive deposition of cementum from the alveolus wall.

All teeth, however, which bore no clinical or other evidence of inflammation, showed structureless cementum.

A study of the following plates will throw light on the nature of cementum and disprove the opinion that "between pulp inside and periosteum outside, there is a continuous chain of living plasm."

Plate 1 shows a section through the root of a replanted tooth.

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[3] Tomes, Dental Anatomy, Page 103.

[4] Noyes: Dental Histology, Page 179.

Granulations are partially detached from the root stump. An area of suppuration is seen at A.

This tooth had been boiled before replantation. At operation two years later, the tooth was found thoroughly septic.

Plate 2 shows a section of the same tooth with old cementum at A deposited before replantation.

Lacunated cementum at B was deposited after replantation. Here the layers of cementum are quite thick.

In the pericemental structure (C fibroblasts are seen clustered on the edge of calcic deposits; some being apparently submerged in the calcified tissue.

D is an area of resorption filled in by young cementum.

Because of the prevalence in the dental profession of such ideas as; that the "reattachment of Sharpey's fibres to cementum depends on scaling or curetting away the cementum until fresh cement corpuscles are exposed," and that there are "vital root apices" after tooth pulp devitalization, it might be well to call attention to the work of Mallory.[5]

Lacunae are spaces containing osteoblasts which have become bone corpuscles and as such have lost their power of proliferation and they no longer play a part in the regeneration of bone.

Bone regeneration must come from osteofibroblasts which are young osteoblasts.

This is in accordance with the view that is taught in the laboratories of Surgical Pathology of the Medical Department of Leland Stanford, Jr. University.

Plate 3 shows osteoblasts as they are in relation to newly formed bone and free on account of an artifact; when these cells become buried they can be considered as end products and their genetic function is at an end.

A. Calcified cartilaginous matrix.

B. Cartilage cells.

C. Periosteal bone.

D. Osteoblasts.

Stain-Hematoxylin and eosin. Obj. ½ in. Oc. 2 in.

Plate 4 shows the mandible of a fully grown dog killed under chloroform. The common carotid artery was exposed by dissection; this was followed up. The internal carotid was ligated as were all branches of the external carotid with the exception of the internal maxillary. A hemostat was applied to the internal maxillary beyond the point where the inferior dental was given off from it. The artery was washed out with saline solution; and mercury was run into the common carotid. The mandible was disarticulated. This was done with the idea of demonstrating the blood supply of the teeth so that the busy practitioner would have ocular evidence of conditions as they are.

The roentgenogram shows the inferior dental artery, the mental and muscular branches, and some of the arterioles leading to the teeth.

A diagram drawing by Dr. F. E. Blaisdell, Plate 5, of actual specimen made by pancreatic digestion. Shows the inner surface of left half of mandible of fetus. The course of the inferior dental artery can be seen. It shows anastomosing arteries entering the bone at the inner surface of the mandible. These twigs were from the lingual or mylohyoid. The specimen was broken during removal from the digesting fluid. Some of these twigs have been seen entering the bone in dissections on the adult cadaver. This blood supply is the rule in the young mandible, often persisting in part in the adult.

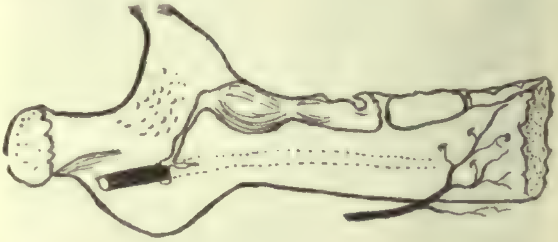

Plate 5.

Specimens at present in the Surgical Pathological Laboratories of Leland Stanford, Jr. University show this point very clearly.

The specimen was obtained from the cadaver of a male fetus.

Dissection exposed the left common carotid and subdivisions. All branches except the facial and internal maxillary were ligated. A canula was inserted in the common carotid artery. After the blood had been washed out with normal salt solution, alcohol followed by acetone, was injected. Celluloid dissolved in acetone, and colored with Chinese vermillion, was then injected.

This technic was repeated on the right side. A strong cord was tied around the neck and the head was severed from the body below the cord.

The head was then immersed in an aqueous solution of sodium bicarbonate and pancreatic ferment. The flesh was fully removed by digestion exposing the bone and the celluloid which had set inside the arterial walls. The specimen showed a very abundant anastomosis at the mental foramen and also at the genial tubercles. Arteries were observed leading into the mixillary bones before the specimen was removed from the jar. During removal these fragile filaments were broken.

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[5] Mallory: Principles of Pathologic Histology. Page 65-75.

Better results will probably be obtained in the near future from the cadaver of an adult.

The preparation of these anatomical specimens is being done under the instruction of Dr. F. E. Blaisdell.

If in conclusion, we were to grant for the sake of argument that there is a continuous chain of plasm between pulp and the pericemental structure, would it not seem absurd to insist that the chain remains unbroken when the pulp is removed? How could the chain be maintained when the plasm could no longer circulate in the pulp chamber?

If the opinion that plasm circulates from the pulp chamber through the cememtum walls into the socket was sound, this would only be one more piece of evidence that pulpless teeth should be removed from the body because drainage from the septic dentine would take place not only by way of the apical foramen, but also by way of these imaginary lacunae and their still more imaginary Haversian systems.

Many vague statements have been made concerning the vitality of devitalized teeth and the possibility of filling them so that they will not be subject to infection. But no evidence has been introduced to prove that devitalized teeth are not dead. Such statements as "The commonly noted persistence of sensitiveness of root canal dentine after thorough pulp removal, suggests a cemental source of vitality, independent of the pulp" are quite misleading. The sensitiveness may suggest a chimerical source of vitality. But evidence proves clearly the lack of such vitality. The sensitive region is apical, as may be determined by amputating the root end. When the root end is removed, the sensitiveness disappears. Dentists generally know the pressure of air through the root end during canal instrumentation affects the sensitive nerve tissue below the root.

Has anyone any real evidence to offer concerning the vitality of devitalized teeth or the permanent immunity of them to infection? Can anyone inform me of a single devitalized tooth which six months after devitalization, did not show traces of infection? Can any one tooth be cited as an exception to the rule I have drawn as a conclusion from the examinations and cultures of hundreds of devitalized teeth; the conclusion that all devitalized teeth are dead, and, within six months from the time of devitalization, infected.

THE MODERN TREATMENT OF BURNS.

WILLIAM SENGER, M.D., F.A.C.S.
PUEBLO, COLORADO.

In the struggle to ease the patients' torment, no class of wounds has been treated in so many different ways as burns.

Five hundred years before Christ, India's treatment for this condition was allied to present methods—namely, using warmed, sterilized wax (but it was applied on a dirty rag). Through the centuries this method with little modification has sifted down to us. Man can remember when our grandmothers treated burns with a mixture of wax, tallow and balm of Gilead buds. To its efficacy we can testify—although, in our supercilious attitude toward home remedies, we relegated such treatment to that increasingly large class where "nature cures the disease while the remedy amuses the patient."

As is usual in most things medical the wax treatment almost disappeared—only to be replaced by varnish, paint, carron oil, adhesive plaster, gum. solution of rubber, greases, wet dressings and powders—nearly anything, in fact, which had as the underlying principle the exclusion of air.

To realize how little we knew of burns, only forty years ago physicians subscribed to the idea that "Death in burns is often due to the mephitic influence of foul air which is so extensively generated in such injuries."

In recent years the open air treatment has had many advocates. It was particularly noted that there was considerable relief from pain—providing, however, that the parts were immobilized and protected from friction. This made us realize that friction on nerve endings rather than air was the cause of pain.

When de Sandfordt a few years ago advertised his paraffin treatment of burns, there was little response;—first, because his "ambrine" was a secret preparation, exploited at exorbitant prices; second, because de Sanfordt was practically an unknown and his recommendations followed the fate so commonly dealt to ideas emanating from all but the noted in our profession; third, it seemed contrary to all ideas of asepsis.

The war finally forced the medical profession to recognize that something must be done to correct the frightful toll exacted by liquid fire. To accomplish this, the surgeon at the front adopted de Sandfordt's modernized application of the wax treatment, first employed 2,500 years ago. And thus the paraffin treatment came into its own.

At the Minnequa Hospital we care for approximately 13,000 employes of the Colorado Fuel & Iron Company. In such an industry the number of burned workers is large. During past years we tried various treatments only to condemn them after a more or less extended trial, until the paraffin treatment became available.

We have used various formulae of this preparation. We feel that several give as good results as "ambrine"; that is, if we use a paraffin which is low melting, elastic, adhesive and, most important, neutral in reaction.

Many modifications contain various antiseptics. The experiments of Sollman would indicate that such substances added to the paraffin are well nigh valueless. They remain locked up in the preparation, giving off little or nothing for sterilizing or stimulating the wound. On the other hand, the addition of eucalyptus, thymol, etc., is of value in substituting a better for a worse odor. As the result of our own investigations, we feel that the proper care of the wound at each dressing is to be regarded as the important factor next to having the paraffin fulfill the requirements already mentioned.

Depending on the depth of the burns our treatment varies. All superficial burns, irrespective of extent or location, are best treated by paraffin. The same is applicable to third degree burns if not large.

We have long been taught that a burn renders the part aseptic; yet how many remain so until the physician sees them? Dirty clothing and dirtier handling have rendered the parts surgically filthy. While it is impossible to sterilize the wound completely much can be done to improve conditions. We have, therefore, throughout the entire care of the case, practiced rigid aseptic technic—even though the treatment is largely antiseptic.

First endeavor to cleanse the parts. Gently and thoroughly wash the burn with Carrel-Dakin Solution—warmed just prior to application. Then dry with an electric blower. Next spray on a two per cent solution of Dichloramin-T. After waiting a few moments, any loose tags of skin are trimmed away. Through each bleb pass a needle threaded with silk. Cut this off close to the margin of the bleb and leave in situ. This will allow the slow oozing of serum. Absorb any excess with blotting paper and once more dry the parts. Spray again with Dichloramin-T and apply the paraffin with an atomizer so as to insure practical freedom from pain during this step. Now apply a layer of sterile sheet cotton and paint this dressing with more paraffin, being careful that the dressing becomes closely adherent to the wound and about the edges. Complete the dressing with cotton pads and bandage. Each day the burn is dressed, following each detail as already described.

Burns thus treated heal with extraordinary rapidity. We do not know why this treatment, seemingly so contrary to modern surgical principles, produces such results. We lock up foul secretions containing various bacteria and the patient recovers in half the usual time. Can it be that the constant protection and immobilization of the tender new epithelium and granulations in the presence of moisture give them the opportunity to grow so rapidly that they ignore the presence of bacteria and literally overcome them by "mass attacks"?

When we consider extensive burns of the third and greater degrees, the problem is far more difficult. We believe it a mistake to use paraffin in these cases unless the parts involved are very limited. The sloughs of large tissue masses must be cleaned up in the shortest possible time. I believe there is nothing so efficacious as the Carrel-Dakin treatment applied in the same manner as for any serious laceration. Daily smears are taken from the wound and when surgically clean, skin grafts should be applied. The sooner this can be done, the better, in order to escape, if possible, keloid formation and contractures.

Skin contributed by friends and neighbors, while spectacular and given in kindness (and incidentally advertising the doctor) has proven of little practical value.

For so common a procedure as skin grafting there are many failures. We have adopted with success this technic:—As soon as the smears prove the wound clean, we apply autogenous Thiersch grafts to the surface after the granulations have been curetted and dried. Each graft should be sacrificed so as to allow free exudation of serum. No air bubbles should be allowed beneath the grafts. After application, we prefer the open air treatment with thorough immobilization of the part. Whenever secretions become excessive, they may be removed by gentle spraying with the Carrel-Dakin's Solution. Not until after the twelfth day is the wound otherwise disturbed. By this time the fate of the grafts is sealed and subsequent treatment should be that of any healthy wound.

Occasionally, however, in deep burns, so much area has been involved that sufficient autogenous Thiersch grafts cannot be obtained. In such a case we believe small island grafts the best substitute, although the probability of much more scarring must be borne in mind. Grafts over joint surfaces, even if but partially covering the wound are essential to prevent contractures.

If in spite of all efforts, contractures impede the usefulness of a joint, or the scar continually breaks down, we have used the method recommended by Dr. J. S. Davis. One splits the scar tissue throughout its entire length. These "relaxation incisions" should be parallel, about two or three inches apart and down to healthy tissue. The scar gaps widely. The gap is filled with Thiersch grafts at once, if the wound be healthy; otherwise one should wait until a healthy granulating surface is obtained. I have used this method in three cases only, but it has proven most efficient.

Contractures producing webs may be treated as webs in any part of the body. This is a two stage operation.

At the first operation a round perforation is made at the highest point to be released. Into this perforation the skin edges are reflected and sutured. When this has healed completely, we have a permanent epithelial lined hole, and are ready for the next step.

The second operation then splits the constricting band from the perforation to the free border of the contracture. The margins are sutured and the contracture does not return. The only precaution to be used is to be certain that the perforation is made at the highest point of the contracture—otherwise the result is not perfect.

Conclusions:—

I believe that the paraffin treatment of burns has the following advantages:—

(1) Immobilizes the wound.
(2) Protects granulations.
(3) Stimulates epithelial growth.
(4) Greatly minimizes pain.
(5) Renders subsequent dressings easy and much more rapid.
(6) Prevents excessive scar formation.

Its limitations:—Third degree burns unless very small should not be treated by the paraffin method. In these cases, use Carrel-Dakin Solution to render the parts aseptic at the earliest moment; then skin graft to avoid scars if possible. If necessary, to combat scars, "relaxation incisions" or the "buttonhole" operation with modifications give best results.

It is easier to suppress the first desire than to satisfy all that follow it.—Buy War Savings Stamps.

Buy what thou hast need of, and ere long thou shalt sell the necessaries.—Buy War Savings Stamps.

GASTRO-ENTEROSTOMY UNDER LOCAL ANESTHESIA; WITH REPORT OF A CASE.

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For several years I have been especially interested in the subject of local anesthesia, and have employed the method for the execution of a great variety of minor and major surgical procedures with considerable satisfaction to myself and without any serious discomfort to the patient in any instance. Contrary to the views of many surgeons, in my experience, the contra-indications to the local or conduction method of anesthesia have been relatively limited, provided the anesthetic agent be properly selected and the requisite care used in its administration. However, nothing in this report should be construed to mean that I am attempting to argue against the employment of any method of induction or general anesthesia, because that would be far from the truth. It is recognized that both methods have a distinct field of usefulness, and neither should be advocated nor employed to the exclusion of the other.

Case Report: M. R., a male, aged seventy-two, had for many years suffered from arterio-sclerosis; and there were also present all the other elements besides years which tend to make a man old. There was a distinct history of irregular vomiting, epigastric pain, anorexia; the patient was decidedly cachectic, and had lost thirty or forty pounds in weight. At the first glance, and based upon the history presented, the clinical diagnosis of gastric carcinoma seemed almost certain; and, indeed, that was my personal opinion. However, gastric analysis demonstrated the presence of no excessive amount of HCL and no foreign acids, which seemed to eliminate the possibility of carcinoma, althought this is not invariably true; in fact, the most prominent diagnosticians are not now placing much reliance upon chemical analysis of the stomach contents in connection with the differential diagnosis of gastric and duodenal lesions. It is known that gastric ulcer has been found present many times without an excessive amount of HCL, and it is also well understood that carcinoma may exist with an abundance of HCL present. Blood examination showed a low red cell count, hemoglobin 70%.

There was no history of food retention, and vomiting had not occurred invariably an hour or two after the ingestion of food as is usually true in duodenal ulcer—although this was the ultimate diagnosis. The retention test was negative; the patient was given prunes and rice at night, and when the stomach contents were withdrawn the next morning these had entirely disappeared. However, since operating on this man I am inclined to think the technic of the stomach washing was not carefully executed, otherwise some retention would certainly have been noted. It may be the lack of retention may have been largely due to the hyper-peristalis which was present, this evidently being nature's effort to overcome the stasis produced by the healed duodenal ulcers.

Operation revealed multiple duodenal ulcers, and these ulcers in healing had made the condition of the patient worse than when they were in active existence. So long as the ulcers were active the pyloric orifice was open, but as soon as the ulcers healed contraction from the presence of the cicatrices caused stenosis. The resulting stenosis produced digestive disturbances, such as pain, belching, nausea, vomiting, finally anorexia and considerable loss in weight had occurred. The stomach contents were stagnant and foul, and the patient's breath had a peculiar putrid odor. When the stomach was opened the same foul odor was evident. This was probably due to putrefactive changes in retained articles of food.

This man had nephritis, cardio-vascular changes, and all the elements which make an individual really aged. He was so debilitated as to preclude the administration of a general anesthetic, and while it was thought some good might be accomplished by the performance of a gastro-enterostomy, just how this could be done in a man of his age and condition was the question which had to be considered. He was very anxious that the operation be performed, and we decided to undertake it under local anesthesia.

An hypodermatic injection of morphine 1/6 grain with atropine 1/150 grain was given one hour before beginning the operation and a 2% novocaine-adrenalin solution was employed for the local anesthetic. The abdomen was opened under this method of anesthesia without the slightest pain, the patient feeling comfortable during the entire operative procedure. The clinical diagnosis was verified, *i. e.*, that carcinoma was not present so far as the macroscopical appearances were concerned, and it also seemed reasonably certain that there were no carcinomatous changes in the healed multiple duodenal ulcers which were found present. Gastro-enterostomy was completed without difficulty.

Ordinarily in cases of this kind little pain results from careful visceral manipulation, and so long as the parietal peritoneum is not extensively disturbed the abdominal viscera can be handled as may be required although the patient remains awake; and that was true in this case. The only pain that occurred was when the jejunum was brought upward to make the anastomosis; the tension thus produced upon the mesentery or the parietal peritoneum caused slight pain, and during this part of the operation a small amount of ether was administered. It has been repeatedly demonstrated that the stomach can be drawn downward, an opening made through the meso-colon, and the transverse colon separated to expose the posterior wall of the stomach painlessly under local anesthesia; but in making the anastomosis proper a small amount of ether is usually required. However, a small quantity of ether acts as a stimulant and tends to overcome shock. This man's pulse was 80 when placed on the operating table, and it was still 80 when the operation was completed.

The time required to complete an operation of this kind under local anesthesia is about twice as long as under general anesthesia. The novocaine solution has to be injected into one layer of tissue, then the operator has to wait for a few minutes before he can proceed, then the next layer is injected, and so on. It is a mistake to attempt rapid work under local anesthesia; but by being deliberate an operation such as described can be successfully executed under local anesthesia in the majority of instances. The patient had little shock as a result of the operation, he reacted promptly, and was allowed to drink sterile water whenever he felt so inclined.

The operation was performed April 16th, 1918, and four days afterward the patient was given any kind of liquid nourishment he desired. Immediately after the operation he was placed in the Fowler position during the day and was allowed to assume the recumbent posture at night. The kidney function showed no variation at any time, and the patient made an uneventful recovery.

There was nothing extraordinary about the operation performed, it being merely a posterior no-loop gastro-enterostomy under local anesthesia. However, a new kind of catgut recommended by Young known as "gastro-enterostomy suture" was used. Ordinarily the commercial catgut is quickly absorbed when it comes in contact with the gastro-enteric juices. Young has devised a suture which resists absorption under these circumstances and will hold longer than other forms of chromic catgut. I have used it in perineorraphy and also trachelorraphy. The stitches remained intact for four weeks and had to be removed; so it must be resistant to other fluids as well as the gastro-enteric juices. It has been found that when silk is used in gastro-enterostomy it sometimes perists and gives later trouble; in a few instances it has had to be removed. In this operation the "Young" catgut was used for the through-and-through or visceral sutures, silk being employed for the external sutures.

I might add that the röentgen ray is an important factor in the diagnosis of gastric and duodenal ulcer. The röentgenographic plate in this case was a splendid illustration of what may be expected from the *x*-ray in diagnosis. The healed ulcers were clearly outlined in the picture after the barium meal. The exact location and the craters of the ulcers were visible, and the hyper-peristalsis was plainly revealed under the screen.

It must be admitted that previous medical treatment had been successful in this case, in that the ulcers had entirely healed; but the patient was worse afterward than before because of the cicatrization. The more obliteration there is at the pyloric orifice, the better are the results obtained from gastro-enterostomy. This has been such a prominent factor that many surgeons now close the pyloric orifice entirely to insure permanency of their gastro-jejunostomy.

According to Farr, in considering the subject of abdominal surgery under local anesthesia, it is assumed that the requirements of the patient are paramount, and that all other questions are of secondary importance. While it seems to be the custom of surgeons to limit the application of local anesthesia to cases in which general anesthesia is contra-indicated, it is the author's belief that the reverse should be true, *i. e.*, that general anesthesia should be employed only when local anesthesia is contra-indicated. He states that the toxicity of novocaine is dependent upon the strength of the solution rather than the total amount used, and its comparative safety makes possible the use of the drug in large quantities. When so employed, with ample incision, careful manipulation, vertical retraction, and an appropriate position of the patient, its scope is greatly broadened. Perfect anesthesia results in negative intra-abdominal pressure, producnig postmosten-like repose which permits optical examination which is, of course, preferable to digital. The author believes the contra-indications to local anesthesia are largely limited to: (a) psychic incompatibility, a small percentage of cases, not excepting children on this account; (b) pathological adhesions to the posterior parietal peritoneum; (c) adherent malignant disease; and (d) very high-lying gall bladders. It is claimed that with local anesthesia abdominal packs are unnecessary excepting to prevent soiling, orientation being obtained by the negative intra-abdominal pressure, vertical retraction, etc.; that it has the advantage of avoidance of the immediate and remote dangers of general anesthesia, excellent exposure and perfect repose of the viscera, greatly reduced trauma, and a marked decrease in post-operative discomforts, such as gas, nausea, and vomiting, with the resultant wound strain; in addition the avoidance of loss of consciousness to which most people strenuously object. Children, says the author, lend themselves especially well to this method of anesthesia. He has performed every abdominal operation by this method (some operations hundreds of times) and prefers it to all others. Should local anesthesia become inadequate, general anesthesia may be employed at any stage of the operation.

In local anesthesia for major operations, Scott claims it is unnecessary to apply the anesthetizing agent directly to the tissues to be incised, that it may be applied entirely outside the line of incision in such manner as to secure and maintain adequate anesthesia. This may be accomplished by thorough infiltration of the skin and subcutaneous tissues on the proximal side near the proposed line of incision, or in two lines, an inch or more apart, between which the incision is to be made. To assist in maintaining anesthesia adrenalin is added to the solution; this also has the advantage of reducing local bleeding during the operation. After the skin and subcutaneous tissues have been incised to the muscular tissues beneath, the fascia or aponeurosis should be anesthetized, especial attention being given to the nerve trunks when possible to locate them. The abdominal facia or muscular sheaths having been infiltrated and incised the subperitoneal tissue then presents; this is the most sensitive area encountered and "is not easily anesthetized if the operator is careless, unskillful, or hasty." The peritoneum is anesthetized by pressing the needle well into the transversalis fascia or posterior sheath of the rectus near the center of the wound. "When the abdonimal wall is properly anesthetized and a sufficiently large wound made to work without strong or rough traction, almost any kind of operation may be satisfactorily done within the abdominal cavity if it does not require much traction upon the mesentery or the separation of firm adhesions." The author states that the solution preferred for local anesthesia is one-seventh of one per cent. novocaine to which about three minims of adrenalin to the ounce is added at the time of operation. For this purpose sterile adrenalin solution is kept in 1 ccm. amber glass ampules.

The principal advantage, says Jacobson, of local anesthesia over other methods is the all-important factor of safety. He believes that no operation on an adult should be performed under general anesthesia which can be equally well executed under local anesthesia. Novocaine 0.5%, with adrenalin, 3 to 5 drops per ounce, is the solution usually employed; the patient complains only during "pulling and tugging"; food may be allowed shortly after operation since there is seldom vomiting. The technic employed by Jacobson is essentially that of Braun and is familiar to every surgeon of average experience. He states that almost any operation which does not involve excessive traction on the viscera can be successfully performed under local anesthesia. This method is particularly indicated in the presence of alcoholism, nephritis, acute pulmonary lesions, and necessary abdominal operation concurrent with myocarditis, suprapubic cystostomy, gastrostomy, jejunostomy, enterostomy, cholecystostomy in debilitated patients suffering from cholecystic empyema or intense choloplania from common duct obstruction, appendicectomy in tuberculous patients, and operation for every variety of hernia and for typhoid perforations, should be executed under local anesthesia. The author has performed one hundred and forty abdominal operations under local anesthesia, one hundred and twenty-five of which were for hernia. He has found the method of great help when combined with general anesthesia to lessen extreme rigidity of the abdominal muscles.

For local anesthesia Regnault prefers novocaine-adrenalin or novocaine-suprarenin. Under such anesthesia he has performed major operations, such as arm amputations, foot amputations, operations for appendicitis, ovarian cyst, etc. In nine hundred operations during the war he has used local anesthesia in about three-fourths of the cases.

Cole presents a resumé of one hundred and fifteen major operations performed in his clinic under local anesthesia within the last two years. The series includes eighty-seven abdominal operations, involving the appendix, the cholecyst, the stomach, the intestines, the ovaries and the uterus; nephrectomy, radical amputation for mammary carcinoma, skull decompression, orbital exenteration, etc. Seven abdominal operations were performed during pregnancy without maternal mortality; there were seven major operations upon children under two years with one death from bronchopneumonia twelve days after the establishment of a Littré artificial anus in a child three days old. Forty-seven patients were between the ages of fifty and eighty-seven, with a mortality rate of 4.5%—two deaths. The first occurred eight days after enterostomy on the fifth day of ileus and peritonitis in a patient of sixty-five; the second four days after drainage on the sixth day of peritonitis in a patient of sixty-eight. Cole concludes that the selection of local anesthesia as the method of choice in cases offering grave mortality risks is a factor of safety too potent to be neglected.

ANO-RECTAL SURGERY UNDER LOCAL ANESTHESIA; WITH CASE REPORTS.

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The question of local anesthesia in ano-rectal surgery is of especial importance for two reasons: First, there are many individuals the subjects of remediable ano-rectal pathology to whom the administration of a general anesthetic would be distinctly dangerous, yet the necessary operative procedures may be safely and satisfactorily executed under local anesthesia: Second, in other instances, because of inordinate fear of a general anesthetic, the aid of surgery is refused or postponed by patients until the supervention of irremediable complications or sequelæ which could have been prevented, had they known operation could be successfully performed under local anesthesia.

For many years after the popularization of local anesthesia for the execution of minor and even major surgery in other anatomic situations, the feasibility of successful performance of painless operations upon the ano-rectal structures without the administration of a general anesthetic was seriously questioned. The reasons suggested for failure to secure satisfactory local anesthesia were: (a) the extreme sensitiveness of the tissus in this region, and (b) more profound anesthetization is required to permit complete sphincteric divulsion than for surgery in other localities. However, as the need for a satisfactory local anesthetic in ano-rectal surgery gradually became more and more apparent, renewed experiments were made with the various agents in vogue.

Reclus (1889) was the first to satisfactorily anesthetize the ano-rectal region by local measures to permit painless dilatation of the sphincter muscle. He employed cocaine in one to two percent solution. The subject was further elaborated later by Schleich (1894) and many other observers. And excepting for the local agents used, variations in strength of the solutions, etc., the present technic of tissue infiltration for the induction of local anesthesia in the ano-rectal area is practically identical with that advocated and practised by these pioneers in the field of local anesthetics.

I am in perfect accord with the views of Allen and many other observers that operations under local anesthesia in this highly sensitive area must be performed with great care, and it naturally follows that any local method of inducing anesthesia must be executed with accuracy and thoroughness to insure a successful outcome. In my opinion weaker solutions should be used than those ordinarily recommended for operations in other anatomic situations.

Allen advocates the following method as being simple, quickly executed and absolutely reliable in the production of perfect surgical anesthesia in the ano-rectal region, and states that he uses it almost invariably in preference to general anesthesia in operating for hemorrhoids, fissure, prolapse, etc. The tissues are first infiltrated subcutaneously around the anus at the muco-cutaneous junction; it is advisable to begin about an inch away in the less sensitive skin and advance toward the anal region where the injection is made circumferentially, than to make the first puncture in this highly sensitive area which will always excite complaint; and in nervous patients, because they become uneasy and lose confidence in the promise of a painless operation. He advises a spray of ethyl chloride on the skin at the point of puncture protecting the anus from contact with the spray by holding a gauze sponge against it. I have not found it necessary in any case to use the ethyl chloride spray as stated since the puncture may be made practically painless by pressure of the skin between the thumb and finger. The circumferential injection is made subcutaneously, as the skin and mucous membrane at their point of junction are very thin, and intradermal injection is unnecessary. By drawing the skin outward with one hand the tissues are stretched thus obliterating folds and creases, making transfixion of a fold with the production of pain less likely. The solution is injected as the needle is advanced; for each reinjection one should start "just back of the point where the needle last stopped." Having completed the circumferential injection, the finger is inserted into the rectum as a guide and a large syringe and long needle employed; the needle is passed through the anesthetized cutaneous area and directed upward into the anal sphincter injecting as the needle is advanced; four points are injected, viz., each side, in front, and behind. Anesthesia results almost immediately, when dilatation can be as thoroughly practiced as under a general anesthetic.*

During early experimental work the greatest difficulty encountered under local anesthesia was the inability to completely divulse the sphincter muscle, which is a primary and essential feature in practically every ano-rectal operation. It was finally determined that by injecting a considerable quantity of a weak solution of the local anesthetic agent into the muscle itself, complete sphincteric divulsion could be satisfactorily accomplished.

The technical details incident to the induction of local anesthesia have been modified and improved, both as regards the sphincter muscle and the tissues requiring removal, until a practically perfect method now exists, and the possibility of satisfactorily performing ano-rectal operations without the administration of a general anesthetic is an established fact.

The advantages of local anesthesia in ano-rectal surgery cannot be overestimated; particularly is this true when the patient has an inordinate fear of a general anesthetic, and when, in the presence of cardio-vascular or renal disease, high blood pressure, advanced tuberculosis, etc., the administration of a general anesthetic would markedly increase the clinical risks. The pertinent facts cannot be ignored that certain patients to whom a general anesthetic might be safely administered have greater fear of the anesthetic than the contemplated surgical procedure, and that many individuals continue to suffer from remediable ano-rectal disease who would willingly submit to operation did they understand it could be safely and painlessly executed under local anesthesia. Moreover, if it were known by patients who have great fear of a general anesthetic and who in consequence postpone indefinitely necessary ano-rectal operations, that adequate relief could be secured under local anesthesia, undoubtedly many cases of rectal carcinoma could be prevented. The supervention of malignant disease upon benign rectal lesions is an important factor which should not be overlooked.

To secure the proper degree of anesthesia local injections should be made at several points, as suggested by Allen, those usually selected being about an inch from the anal verge anteriorly, posteriorly, and laterally. Let it be again emphasized that divulsion of the sphincter muscle is necessary as the primary step in the majority of ano-rectal operative procedures; even where it is possible to excise the diseased tissue without sphincteric divulsion, it still is required: (a) to lessen post-operative pain, and (b) to obviate subsequent sphincteric contraction and relaxation which might markedly interfere with the healing process.

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* Abstracted with Modifications from Allen "Local and Regional Anesthesia."

Among the reasons given for failure to secure satisfactory ano-rectal local anesthesia are: (a) the selection of an unsuitable anesthetic agent, (b) one whose toxicity is so great that fear of systemic poisoning tends to prevent the employment of a sufficient quantity to produce the desired effect, and (c) imperfect technic in the introduction of the selected agent into the tissues sought to be anesthetized. Therefore, selection of the anesthetic agent is a matter of considerable importance. Cocaine should never be employed in ano-rectal surgery for reasons which are too obvious to require enumeration. Some surgeons prefer quinine-ureahydrochloride, whereas others consider novocaine or apothesine more satisfactory for the purpose.

The following ano-rectal surgical procedures have been satisfactorly executed under local anesthesia: operations for external and internal hemorrhoids, benign rectal neoplasms, anal fissures; divulsion of hypertrophied and irritable sphincter muscles; curettment or excision of ano-rectal ulcers of whatever type; opening of ano-rectal abcesses; excision of ano-rectal fistulae; operations for anal pruritus, etc. It must be obvious, however, that total excision of the rectum for carcinoma, or for extensive syphilitic stenosis, would be difficult or impossible of satisfactory accomplishment under any form of local anesthesia.

In the subcutaneous introduction of a local anesthetic agent in any anatomic situation, the importance of "pressure anesthesia" in the prevention of undue pain from needle puncture must always be remembered. By grasping the integument between the thumb and fingers and exerting pressure just short of the production of so-called "pressure pain," the needle may be inserted without much discomfort to the patient. For the induction of local anesthesia in ano-rectal operations, the skin and subcutaneous tissues are first injected, the anesthetic agent being subsequently introduced into the deeper structures as required during execution of the operative steps.

The subjoined case records are presented as illustrating several types of pathology which may be successfully treated by appropriate surgical measures under local infiltration anesthesia. The administration of a general anesthetic seemed distinctly inadvisable in any of these cases for reasons which may be readily understood.

Case 1. A. S., a male, aged forty-eight, superintendent of a large manufacturing plant. He was an individual of average physique, fair muscular development, but very pale and had a worn, exhausted appearance. His respirations were rapid and he had apparently lost considerable in flesh. The patient was referred to me because of "hemorrhage from the rectum."

Present complaint: Inability to work, easily exhausted, dyspnea constant, increased by exercise; constipation; digestion impaired; loss of much blood during each act of defecation, occasionally at other times.

Personal history: The patient claimed to have been healthy and active all his life, but had been greatly annoyed for the last twenty years by protruding hemorrhoids which began to bleed eight or ten years ago. During the last two years hemorrhage had steadily increased, and for more than a year the effect on his general health had become more apparent. Family history negative.

Examination: The patient was weak and faint, dyspnea was marked, and he moved and talked with considerably difficulty. Heart: mitral regurgitant murmur present, apex displaced. Feet and legs to knees greatly swollen and pitting was noted on pressure. Heart action rapid, irregular, intermittent. Hemoglobin, 70%. Albumin and granular casts present in urine. His condition seemed to preclude the administration of a general anesthetic. Rectal examination revealed several large interno-external hemorrhoids which bled profusely when everted; the rectal mucosa was not ulcerated but very thin and bled upon slightest touch.

Operation: Preparation of the rectum and surrounding region the same as for operation under general anesthesia; operative steps executed under local infiltration anesthesia. About one ounce of a one-quarter of one per cent solution of novocaine-adrenalin having been already prepared, an ordinary hypodermic syringe with long needle was used for its introduction into the tissues. While special syringes may possess some advantages they are unnecessary in my opinion. Injections were made at four different points; the needle was first inserted obliquely just through the skin in the anterior median line at the junction of healthy and hemorrhoidal tissue and the solution deposited as it was slowly advanced around the protruding hemorrhoidal mass, about 4 c.c. being injected for each one-fourth of the rectal circumference. The needle was then withdrawn and inserted in the posterior median line and the solution injected as before; then again withdrawn and introduced laterally (each side) and the process repeated, thus completing the circle. Then at four equidistant points the needle was inserted into but not through the sphincter muscle, and 4 c.c. of the solution was likewise deposited in each quarter of the sphincter. The anal canal was then again carefully cleansed with soap and water. Within a few minutes anesthesia was sufficiently profound to permit complete divulsion of the sphincter thus bringing the hemorrhoidal mass into full view. The excision and immediate suture operation was then performed without difficulty, the patient complaining of but little pain. I might add that during the operative procedure some of the deeper tissues were anesthetized by injecting a small quantity of the solution whenever a sensitive point was reached. The "Asman and tube" was then inserted, the usual outer dressing applied, and the patient put to bed without shock.

The post-operative period in no way differed from that noted where similar operations are performed under ether. Prompt healing occurred and the ultimate outcome was perfect.

Case 2. Dr. T. D., male, aged forty, a busy general practitioner, came to me complaining of intense pain in the anal region. He stated that time did not permit of his going to the hospital for treatment, and that he had great aversion to the taking of a general anesthetic. He asked if palliative measures would not suffice to give him at least temporary relief and enable him to continue his work. His general physical condition had no bearing upon the rectal lesion, his trouble being purely local.

Rectal examination disclosed two large thrombotic hemorrhoids at the posterior anal verge, and between them in the median line there came into view when he was asked to strain as if defecating, an anal fissure which extended almost through the integument. It was undoubtedly this fissure which had caused the most of his pain. Replying to the question which he asked before the examination began, concerning the value of palliative treatment by local applications, etc., I suggested that surgical excision of the hemorrhoids and the anal fissure under a local anesthetic and closing the wounds by suture, would give him much speedier and more enduring relief than ointments or other local applications which might be prescribed. He was suffering intense pain at the time and readily agreed to my suggestion.

A sufficient quantity of the local anesthetic agent already mentioned, in one-quarter of one per cent solution, was injected just under the skin along the line of the proposed incision, and into the tissues beneath the anal fissure and the hemorrhoids; then with scissors curved on the flat the hemorrhoids and the diseased tissue lining the anal fissure excised; the wound edges were loosely opposed with catgut sutures. A small piece of gauze dusted with stearate of zinc powder was then applied and held in place by strips of adhesive plaster. The patient was permitted to continue his work and requested to report the following day, which he did, saying that while the parts were somewhat tender he was entirely free from the throbbing pain which had been produced by the hemorrhoids and fissure. The wound was re-dressed from day to day, union progressed satisfactorily, and within ten days healing was complete.

Case 3. J. M., a male, aged sixty-eight, had been in bad general health for several years, and in addition he was the subject of locomotor ataxia. He had suffered from large hemorrhoids for a number of years which protruded during defecation. When asked to see this patient in consultation he was just recovering from a severe attack of pneumonia. His hemorrhoids had protruded for about a week, the attendant being unable to replace them because of an unusually tight sphincter muscle.

Examination showed that the large protruding hemorrhoidal mass was very dark in color and at two points beginning gangrene was evident. The condition of the man's lungs, his weakened physical state, and the fact that he had sugar in his urine, precluded the administration of a general anesthetic. Accordingly after the application of a soap poultice for several hours and careful cleansing of the protruding mass, he was operated upon under local anesthesia, the method of its introduction being practically the same as described in Case 1. The patient made an uneventful recovery, and so far as the hemorrhoidal operation was concerned, was ready to leave the hospital before he was entirely well of his pneumonia.

Case 4. R. S., a male, aged thirty, an active vigorous looking man, butcher by occupation. This patient came to me complaining of severe pain in the peri-anal region and gave the following history: Six years previously he had a large ischio-rectal abscess which was allowed to rupture spontaneously and discharge. The external opening finally closed but reopened at intervals of two or three months. A physician whom he consulted four months prior to the date of my observation told him that he had an ano-rectal fistula which could be cured by the injection of bismuth paste. This treatment was accepted and the bismuth paste accordingly injected.

The external opening of the fistula closed within a short time, and the patient thought he was well.

A few months later, however, pain in this region again became intense and he was referred to me for examination and treatment. This man was unwilling to take a general anesthetic which probably accounts for his accepting the bismuth paste treatment a few months before. He stated, however, that he was willing to bear any reasonable amount of pain if an operation could be done, as he expressed it, "without putting him to sleep."

Rectal examination disclosed a small internal opening between the two sphincter muscles. The fistulous tract which showed marked induration could be easily traced to the former external orifice. It was apparent that considerable dissection of tissue would be necessary to completely excise the diseased area.

The same strength solution was employed for infiltration anesthesia as in the other cases. The first injection was made on a line immediately over the fistulous tract, anesthetizing the skin and adjacent tissue on each side; then with a long needle the tissues underneath the tract were anesthetized as well as possible. The skin and intervening tissue then being incised, the indurated area surrounding the fistulous tract was carefully dissected and removed from the outer end to and including the tissues surrounding the internal orifice. In the excision of several branch sinuses additional infiltration with the anesthetic solution was required. The dissection was continued until the entire area involved in the fistulous tracts was removed. The resulting cavity, which was quite large, was packed with gauze and after the insertion of the "anal tube" the usual outer dressing was applied. Because of the shape of the wound and the large amount of tissue removed, immediate suture was impossible, and the wound was allowed to heal by granulation from the bottom.

A perfect result was secured, the patient leaving the hospital in three weeks. Healing of the entire wound was complete in about eight weeks. This case shows that extensive operations for ano-rectal fistula can be successfully performed under local anesthesia.

An interesting feature in connection with this case is that the fistulous tract, instead of being about the size of a slate pencil as these sinuses usually are, was more than one inch in diameter; and inside this main tract was found at least a dram of the bismuth paste which had been injected by the physician who had formerly treated the patient.

If you would be wealthy, think of saving as well as getting.—Buy War Savings Stamps.

THE VALUE OF HEXAMETHYLENE-TETRAMINE PROCTOCLYSIS AS A POST-OPERATIVE MEASURE.

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The use of hexamethylene-tetramine after major operations has been my practise for many years and its physiological effects have been demonstrated by its action on certain organs. Many physicians recommend it as a valuable antiseptic for the genito-urinary system, but aside from this use its therapeutic value had been somewhat limited.

Experimental and clinical studies in recent years have taught us that it is indicated not only for diseases of the uro-genital tract, but that it has a specific action on the cerebro-spinal system, the mucous membranes of the nose, throat, and the bronchial tubes and also on the alimentary canal.

Flexner has demonstrated that the terrific damage produced in the anterior horns in acute anterior poliomyelitis often is prevented if hexamethylene-tetramine is used in the early hours of this disease. This is vitally important as we are well aware of the paralyses that usually occur with this serious infection.

The rhinologist uses this drug in the every day nose and throat conditions and the internist has recently added it to his armamentarium for combating pneumonia.

In searching the literature on post-operative treatment I find that practically nothing of importance is mentioned of the therapeutic value of hexamethylene-tetramine after abdominal operations. It is an established fact that after some abdominal operations, certain toxins have a tendency to attack the excretory organs. These toxins sometimes tend to inhibit the function of the kidneys and intestines, producing an auto-intoxication which manifests itself in the form of kidney insufficiency or acute intestinal stasis. The toxemia is the result of the action of numerous infectious agents which have gained entrance into the system through various channels. To offset the damage that is produced by these invading bacteria after operation, it seems perfectly rational to administer an antiseptic substance that acts on the genito-urinary tract and the alimentary canal.

For a long time it became somewhat of a routine measure for me to order for my post-operative cases the following solution by mouth.

℞
Hexamethylene-tetramine grs. x
—
Aquae Destillatae O s/s
M.et Sig:—
℥i. q. half hour.

This treatment was begun as soon as vomiting ceased and it proved to be a valuable measure after abdominal operations. Catheterization was rarely necessary, thirst was greatly relieved, abdominal distention seldom occurred and it acted as a prophylactic to post-operative intestinal stasis. The only disadvantage of this method was that the solution could not be administered by mouth in cases of persistent post-operative vomiting or when there was unconsciousness. Now I have the solution given by rectum, using the same principle that is practised in administering the Murphy drip.

To render hexamethylene-tetramine effective, it is advisable to add to the solution acid soda phosphate or some other acid medium. Eight ounces of the combined solution may be administered three or four times daily.

The Murphy drip frequently acts as a life saver in the presence of hemorrhages and when the system has been drained of considerable fluid. Clinical experience with saline proctoclysis has convinced us that the bowels are capable of absorbing immense quantities of fluids which help to restore blood pressure, favor the dilution and elimination of toxins, promote peristalsis, relieve gaseous distention and produce a stimulating action on the heart and circulation.

Saline proctoclysis is sometimes irritating when given in large quantities and numerous observers claim that it interferes with the function of the kidneys on account of the excessive amount of chlorides that are absorbed by the system.

Hexamethylene-tetramine proctoclysis has an advantage over saline solution in that it has the additional properties of a urinary disinfectant and an antiseptic of the alimentary canal including the gall bladder and bile passages.

*In discussion of Charles H. Mayo's paper on the Etiology, Symptoms and Treatment of Gall Bladder Disease before the Bronx County Medical Society in January 1916, I attempted to emphasize the importance of hexamethylene-tetramine proctoclysis as a post-operative measure following cholecystectomy and cholecystostomy.

Bacterial infection should be considered one of the prime factors in the etiology of diseases of the gall bladder and biliary passages. Inasmuch as constipation is more prevalent in women, this condition would be an important factor in loading upon the liver a great number of bacteria which have ascended from the colon or have migrated to the liver by way of the portal circulation. This probably explains the prevalence of gall bladder disease in women.

Cholelithiasis should be considered one of the end results of biliary infection and when we drain or remove the gall bladder because of stones, it does not necessarily mean that the underlying cause of this condition is removed. To effect a complete cure, we should endeavor to treat the primary source of the infection, and we therefore should attempt to destroy the bacteria and their toxins. This can be accomplished by administering a therapeutic agent that acts directly on the alimentary tract.

1882 GRAND CONCOURSE.

DEATHS FROM VENEREAL DISEASES.

Venereal diseases are communicable and highly dangerous, and as communicable diseases they must be guarded against, according to State and national health authorities. The silence regarding these diseases has been due to their connection in many cases with immorality. The other phase of the subject, namely, the spread of the disease to the innocent as well as the immoral, will come into prominence with the nation-wide effort to curb the evil which threatens society.

The necessity of prompt and drastic action in making known the danger from venereal disease is evident when the increased possibility of infection, due to war conditions in this country and abroad, is considered. Every war up to date has been followed by a large increase in these diseases. The estimated number of deaths in 1916 due to venereal disease in the United States was 250,000. Osler puts syphilis next to tuberculosis, pneumonia and cancer as a death-dealing agent. In New York in 1914, of 25,653 cases of disease reported 28 per cent were syphilis, 21 per cent tuberculosis and 13 per cent diphtheria. Such figures indicate only a small part of the damage done society by the disease. The injury to the future children of the race and to innocent people now free from infection cannot be estimated. The time to talk and talk frankly has come.—*Maine Health News Bulletin.*

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*Mayo-New York Medical Journal 3/4/16.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, FEBRUARY, 1919.

TESTS FOR RENAL FUNCTION.

An evaluation of kidney function is of interest to the surgeon and to the internist. A careful consideration of what the patient's kidneys can do or may be called upon to do, not infrequently will alter the surgeon's point of attack as well as his entire course of treatment; and this appraisal of kidney function is applicable in every branch of surgery as well as in the particular field of genito-urinary diseases.

The pathologists studied and grouped kidney diseases according to the pictures they found at autopsy. In this way our clinical impressions of the living patient were made to conform, if possible, with the anatomic picture of the dead patient's kidneys. Of the true physiological and chemical processes of the living kidney, we had but little idea and could, therefore, have no standard for measuring kidney usefulness in health and in diseases. It is obvious that for the physician and patient also the chief interest would be in the question what could the kidney do, and not in the realization of how much anatomic change the organs may have undergone; for it may well be that the moderately, or even fairly well advanced, change in the structure of the kidney may impair its function but little while, in a striking measure, the converse may be true.

This entire question has been quickened and brought into fresh interest by modern workers who have made it apparent that the kidney possesses a range or, better still, an index of function in its capacity to excrete water, salts, solids in general, and foreign dye. Moreover, others have demonstrated that inability on the part of the kidneys to properly filter or secrete produces an accumulation in the patient's blood of the waste products of metabolism, and that these products are deleterious and that they can be measured with considerable precision.

Much can be learned from the study of a single fresh specimen of urine or from a 24-hour specimen of urine. The presence of albumen denotes distinct kidney impairment and when albumen is present with a negative sediment lues should be carefully ruled out.

The urine of healthy kidneys varies in concentration, depending upon the diet, mode of life, etc. The amount of solids in the urine will fluctuate, the normal kidneys evidently presenting no barrier to the ebb and flow of urinary change. In the diseased kidney there is a barrier and this is evidenced by the fact that the urine maintains practically a sustained low level of concentration of solids. This phenomenon has been called "fixation of specific gravity," and is manifest particularly in the night specimens of urine when the patient has been at rest and has partaken of no food or fluid. This principle has been carefully worked out, notably by Mosenthal, who has devised a test which is applicable in a simple manner in every-day practice.

The phenolsulphonephthalain test demonstrates the ability of a kidney to excrete a foreign dye. The test was proposed and adequately described in 1910 by Rowntree and Geraghty. Its use is very general and it presents no difficulty in its routine applicability. For these reasons it has supplanted the use of methylene-blue and indigo-carmin and has made the phloridzin and cryoscopy tests almost obsolete.

The study of the blood may be very valuable. Determination of the urea nitrogen in the circulating blood may vary greatly from the normal, but we may learn much if we understand the rate and thoroughness with which the kidneys may be capable of excreting this urea nitrogen from the blood into the urine. And this relationship can be expressed as a co-efficient or index of urea excretion. In the same way we may study the amount of non-protein nitrogenous waste products in the human blood and ascertain the incoaguable total nitrogen, the uric acid, and the creatinine—our results may be illuminating.

Ambard worked out a formula for this index which has been modified and made simple by McLean.

Finally though strictly not tests for renal function, one should not fail to take proper blood pressure readings and to interpret the significance of systolic and diastolic pulse tension; nor should one neglect to examine the fundi of both eyes.

A proper plan for the determination of kidney function is now feasible. We may learn what the kidney may do when at rest or when called upon to take care of unusual amounts of solids, water or dye. We may learn if the kidneys have been so impaired that they have become obstacles to the proper elimination of metabolic products. Our interest is no longer in the anatomic pathologic change in the dead non-functional kidney but rather our interest lies now primarily in an evaluation of the margin or residue of usefulness in the living, functionating kidney.—H. R. M.

ARTIFICIAL RESPIRATION.

The Third Resuscitation Commission, under the auspices of the Committee on Safety Rules and Accident Prevention of the National Electric Light Association, at its last meeting considered various efficiency methods of artificial respiration for emergencies as they are met with in peace as well as in war. This Commission, created about six years ago, has been investigating various phases of artificial respiration, including the mechanical and manual methods, and its conclusions, as reflected in resolutions adopted, merit careful consideration by the medical profession, medical colleges, hospitals, ambulance surgeons, fire and police departments, industrial plants, and the general group of persons interested in first-aid work.

It is significant that while there is an increased tendency to utilize mechanical devices, general dependence must continue to be placed upon the prone-pressure or Schäfer method, because of its ready availability when apparatus for resuscitation is far from the scene of the accident. Reliance upon the use of special apparatus tends to diminish the efforts to train persons in the manual methods, and apparently discourages the prompt and persevering use of non-mechanical methods. Dependence upon the theoretical value of mechanical methods not infrequently deprives patients of the opportunity of receiving uninterrupted and continued artificial respiration because of the desire of a physician or police officer to hasten the removal of the patient to a hospital, thus increasing the risk of unsuccessful attempts at resuscitation.

It is unfortunately true that in many instances the methods of artifical respiration have received inadequate attention in hospitals and medical colleges, so that satisfactory handling of patients requiring this form of treatment is not always secured promptly.

In view of these facts, the following resolutions adopted by the Third Resuscitation Commission at its meeting, May 17, 1917, command careful attention:

"1. The prone-pressure or Schäfer method of resuscitation is preferable to any of the other manual methods.

"2. Medical schools, hospitals, fire and police departments, the Army and Navy, first aid associations, and industrial establishments in general, should be urged to give instruction in the use of the prone-pressure method of resuscitation.

"3. Individuals who, from accident or any other cause, are in need of artificial respiration, should be given manual treatment by the prone-pressure method immediately on the spot where they are found. It is all-important that this aid be rendered at once. The delay incident to removal to a hospital or elsewhere may be fatal, and is justifiable only where there is no one at hand competent to give artificial respiration. If complications exist or arise, which require hospital treatment, artificial respiration should be maintained in transit, and after arrival at the hospital, until spontaneous respirations begin.

"4. Persons receiving artificial respiration should, as much as possible, be kept warm and the artificial respiration should be maintained till spontaneous breathing has been permanently restored, or as long as signs of life are present. Even in cases where there is no sign of returning animation, artificial respiration should be kept up for an hour or more.

"5. A brief return of spontaneous respiration is not a certain indication for terminating the treatment. Not infrequently the patient after a temporary recovery of respiration stops breathing again. The patient must be watched and if normal breathing stops, the artificial respiration should be resumed at once.

"6. Artificial respiration is required only when natural respiration has ceased. In cases of simple unconsciousness from any cause in which natural respiration continues, artificial respiration should not be employed without medical advice.

"7. The Commission recommends that in cases of gas asphyxiation, artificial respiration, whether given by a manual method or by special apparatus, should be combined when possible with the inhalation of oxygen from properly constructed apparatus.

"8. With regard to the employment of mechanical devices for artificial respiration the Commission feels that it ought not at present to take a definite stand either for or against any particular form of apparatus. However, the Commission recommends, that the use and installation of apparatus should be confined, for the present, to properly equipped institutions under medical direction. The Commission recognizes the great need of simple devices capable of performing artificial respiration reliably and efficiently. It therefore recommends a careful study of the problem, directed toward ***the development of a reliable method appropriate for general adoption***. Such studies can best be carried on in properly equipped hospitals and laboratories which offer opportunities and facilities for critical observation and experimentation."—I. S. W.

INFLUENZAL COMPLICATIONS.

Now that the epidemic of so-called Spanish Influenza is passing and we have time to take stock of the various phenomena that it has presented we are struck rather forcibly by the peculiarity of its complications. Resembling the grippe that we have had with us for years it differs from it in the paucity of complications involving the ears and the upper air passages. During the main epidemic the only complications—or almost the only complications—were pulmonary. Pneumonias of a peculiarly toxic type, bronchopenumonia involving large areas to which an unusually large proportion of the patients succumbed. In the ordinary grippe, such as we are accustomed to see every winter there is a relatively large number of cases that devęlop otitis media. In most instances this acute otitis subsides either with or without myringotomy. Sometimes it persists and a chronic purulent otitis supervenes. In a number of cases mastoiditis dedevelops and the patients come to operation. The proportion of these cases vary slightly from year to year but the mean is almost constant.

In another group of cases, determined probably by anatomical considerations, there are accessory sinus complications which may or may not require surgical interference. The number of these cases too remains fairly constant from year to year.

In this epidemic on the other hand, there has been a notable absence of these usual complications or sequelae. In a few instances, very few considering the pandemic character of the infection, there have been otitic manifestations. Some of these have been followed by mastoiditis but it seems to be the consensus of opinion that this number has been disproportionately small.

There has been, almost universally, a very red and markedly congested pharynx. The nasal mucosa and that lining the sinuses has been similarly involved and it is to this engorgement that the very frequent epistaxis is due. Many of the patients complained, especially during the pyrexia, of severe headache, usually frontal. The headache subsided with the fall of the temperature and the lessening of the nasal engorgement. It is more than likely that much, if not all of the headache is due to the swelling of the mucosa lining the accessory sinuses with consequent pressure and damming back of secretions.

Whether these patients will show later developments along these lines or whether they will be more than ordinarily susceptible to the diseases of the upper air passages such as we see every winter the cold weather season will demonstrate.

L. K.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

The Work Prescription.

Occupation therapy, and, indeed, all reconstructive work for soldiers suffering physical and mental handicaps must be begun early in order to achieve most successful results. Increasing importance is being attached by physicians in military and other hospitals to the provision of scientific ward occupation at the earliest possible moment in hospitals. In fact, it appears to be a fundamental principle that ward occupations are a necessary part of the process of rehabilitation. The Federal Board for Vocational Education has issued, in its Re-education Series, *Bulletin Number* 25 dealing with the entire question of "Ward Occupations in Hospitals." In this pamphlet there is pointed out the difference between mere "busy work" that possesses practically no therapeutic justification other than that arising from its diversional character and real occupations. Obviously, occupation possessing social and economic value to the patient are of greater therapeutic value than those which, while recreational, are weak on the side of vocational or educational content.

Ward occupation has not been sufficiently regarded in its normal relations to technical training and placement in industry, but a larger volume of experience indicates that later steps are successful in due proportion to the inspiration secured from ward occupations, together with the development of concentration, application and the will to "Carry on." Dean Allen Cullimore of Delaware College states "This assignment" (ward occupation) "should take place at the latest on the next day following his arrival at the hospital—an interval of a week in idleness is fatal."

While it is true that hospital patients are there preeminently for medical treatment, their physical condition is of primary concern, and all ward occupations should be studied with relation to their therapeutic values, including both the psychological and physiological possibilities. An improved mental condition and a more optimistic outlook on life most naturally results from a diverting occupation which allows wounds and distress to be relegated to a position of secondary interest. It is of no inconsiderable value to attempt to normalize mental states, but this becomes possible only after an investigation of the methods utilized. General mental states cannot be attacked on a single line without most careful discrimination any more than all physical states are curable by the identical drug. Similiarly, ward occupations demand a certain degree of expert knowledge, which, after consultation with the attendant physician, results in an intelligent occupation prescription.

Every process requires adaptation to the mentality of the patient, and must be administered with the therapeutic purpose definitely in mind. Movements of relaxation are helpful to excitable patients, while stimulating processes are required for those afflicted with languor, and processes involving concentration aid those who are depressed, while monotonous procedures tend to subdue those unduly exhilarated. Indifference must be overcome by processes of interest and variety, while continued application most aids those suffering from restlessness.

The length of time patient should be employed at one kind of work, his rate of progress, the change of work demand trained judgment. "The therapeutic value of an occupation is gone to some patients the moment the occupation is fully mastered, and recovery is measured by the systematic change from occupation to occupation, each demanding more initiative and concentration. On the other hand, the continued practice of an occupation long after its mastery gives to other patients just that poise and self-confidence essential to recovery."

Reeducation through ward occupation includes influence upon the will, thought function and feeling, though the greatest emphasis should lie on the reeducation of the will, upon which is dependent both initiative and application—transitional results of utmost service.

Physiological values of ward occupations apply to patients confined to their beds as well as to those convalescent and able to be about, though suffering from various anatomical defects and physiological handicaps. It must be borne in mind that no occupation is therapeutic in itself, but only becomes so as it is selected and taught in relation to particular disabilities. Where limitations of movement are involved, the benefits of the functional reeducation may be gauged by various schemes of measurement which have been devised for particular movements. It is patent that all instruction through occupation should call into play the particular muscles or joints needing exercise. The aim is not so much nicety of performance as physiological development. Functional reeducation must be begun early and the more permanent the disability is likely to become, the earlier is it required, despite the nature of the existent handicap.

Ward occupation must be taken out of the category of end performances and to be regarded as the first step in complete rehabilitation. All occupations, especially those given to patients seriously incapacitated, should be esteemed only insofar as they form steps in a process of progressive education leading to the ultimate control of functions to the limit of potentialities.

The idea of the work prescription is possibly new to many, although it has been utilized for many years in connection with the treatment of tuberculosis, blindness, and various deformities. Work for patients should be permissive, and not mandatory. It should play as large a part in the routine of hospital life as the treatment with drugs, water, electricity, or massage. The creation of a spontaneous interest and enthusiasm for work enables functional results to be attained more quickly and with greater success than is possible without the benefits of interest, education and functional restoration through individually adapted occupation. "Whether the patient is conscious of work being definitely prescribed to aid his condition or whether he is thinking of occupation as a privilege not interfering with his recovery, the determining of occupation must always be a matter of serious consultation between the doctor responsible for the patient and the ward occupational therapeutist. Whether the patient knows there is a prescription or not is a matter of psychology; but it is always necessary that there be a prescription, and the results of occupational treatment should be charted."

Book Reviews

Gynecology. By William P. Graves, M.D., Professor of Gynecology at Harvard Medical School. *Second Edition,* Thoroughly Revised. Octavo volume of 883 pages with 490 original illustrations, 100 of them in colors. Philadelphia and London: W. B. Saunders Company, 1918. $7.75 net.

The second edition of this most excellent work differs from the first in that new material has been added in those sections devoted to the relationship of the ductless glands to gynecology; and in the addition of a new section describing the relationship of the sex impulse to gynecology which is based on the now generally accepted theories of Freud.

In every way this second edition upholds the excellence of the first: it is well written, beautifully and sufficiently illustrated, and handles the subject with a lucidity which should make this a valuable book for reference.

Lecons de Chirurgie de Guerre. (Lectures on War Surgery.) Published under the auspices of the Service de Sante and under the direction of Cl. Regaud, Professor in the Pasteur Institute and Director of the Centre of Teaching at Bouleuse. Octavo of 394 pages with 171 figures. Paris: Masson et Cie, 1918.

This volume consists of a series of lectures given during the course of a period of instruction given for the benefit of the French military surgeons, at a centre established by the Service de Sante of the French army. Some of the sections have already appeared in substance elsewhere. The contributors are the members of the teaching staff, Guillain, Jeanbrau, Lecene, Lemaitre, Leriche, Magitot, Mocqot, Nogier, Okincyz, Piollet, Policard, Roux-Berger, and Tissier.

Practically the entire field of military surgery is covered in this volume; wounds are discussed in general, in regard to their pathology and bacteriology; and are followed by excellent chapters devoted to the extremities, the thorax, abdomen, etc. A fine chapter is devoted to the important subject of transfusion; one notes that the citrate method is apparently gaining in favor and may ultimately dominate the field. Certainly under war conditions it is the ideal method.

Large sections are devoted to the primary and secondary suture of wounds; to the treatment of fractures, and joint wounds, to which orthopedic principles are applied; and to amputations.

The volume is a compilation of all the information which the present war has called forth.

Physiology and Biochemistry in Modern Medicine. By J. J. R. Macleod, M.B., Professor of Physiology in the University of Toronto, Toronto, Canada; formerly Professor of Physiology in the Western Reserve University, Cleveland, Ohio. Assisted by Roy G. Pearce, B. A., M.D., Director of the Cardiorespiratory Laboratory of Lakeside Hospital, Cleveland, Ohio, and by others. 903 pages, with 233 illustrations, including 11 plates in colors. Published by C. V. Mosby Company, St. Louis, 1918.

The purpose of this volume is to emphasize the importance and value of physiology and biochemistry in the routine practice of medicine. It deals with the present day knowledge of these vital subjects and attempts to show how great is their bearing upon a proper understanding of disease. For the internist, in the general, certain branches would have a limited value, therefore no space is devoted to the physiology of the special senses, of reproduction, of nerve and muscle. Nor have the writers tried to include and discuss the many and various biochemical tests of body tissues and fluids.

The plan of the book is practical. Part 1 is devoted to the physiochemical bases of physiological processes The essential fundamental laws of physics and chemistry are clearly outlined and then important tests and processes are discussed, *i. e.,* H ion concentration, regulation of neutrality in acidosis, specificity of hygiene action, etc.

The circulating fluids are treated in part two, while part three considers the circulation of the blood. Here are many chapters of much value and interest for the cardiographist. The respiration, the digestion, the excretion of urine, metabolism, the endocrine organs, and the central nervous system—each receives a separate portion of the volume, so that in reality this book consists of nine quite distinct monographs, each one, though not exhaustively complete, yet containing an excellent resumé of the important physiological and biochemical laws which have to do with their respective subject.

The book is written to be of use and help to the doctor who practices surgery and medicine. It has, therefore, a distinctly practical value.

Vaccines and Sera—Their Clinical Value in Military and Civilian Practice. By A. Geoffrey Shera, B.A., M.D., B.C., Cantab. M.R.C.S., Eng.; L.R.C.P., London; Honorary Captain R.A.M.C.; Clinical Pathologist to the British Red Cross Hospital, Netby; late Clinical Pathologist, Central Military and V. A. D. Hospitals, Eastbourne; late Clinical Assistant (Medical), Evelina Hospital for Children, S. E.; late R.M.O., Fulham Infirmary, S. W. With an introduction by Sir Clifford Allbrett, K.C.B., M.D., F.R.S., Regies Professor of Physic, University of Cambridge, 226 pages. Price $2.50. Henry Frowde and Hodder and Stoughton, London.

This little volume aims to outline and to briefly indicate the present means of specific therapy, particularly vaccines and serums. Under vaccines the author considers the specific vaccine for its specific "disease group." Dosage, indications, effects are all given. Under sera are mentioned anaphylaxis and serum illness, the "endotoxin" disease, and those due to filterable viruses. Lastly, there are two short subdivisions, one devoted to specific therapy of special women's and children's conditions, the other devoted to normal and auto serum therapy.

The book is brief and practical.

Compendium of Histo-Pathological Technic. Emma H. Adler, formerly Technician Pathological Laboratory, Presbyterian Hospital, New York. New York: Paul B. Hoeber, 1918. Octavo of 82 pages. Price $1.25.

As a brief compilation of the technic utilized in the pathological laboratory of the Presbyterian Hospital of New York this little booklet offers itself to the student untrained in laboratory work. The modest author makes no pretense of original contribution, nor, indeed, of presenting anything save methods which have been tried and found satisfactory in the routine work of a large laboratory.

Dispensaries: Their Management and Development. A Book for Administrators, Public Health Workers, and All Interested in Better Medical Service for the People. Michael M. Davis, Jr., Ph.D., Director of the Boston Dispensary, and Andrew R. Warner, M.D., Superintendent of Lakeside Hospital, Cleveland. New York: The Macmillan Company, 1918. Octavo of 426 pages. Price $2.25.

The growth of dispensaries in the United States and their value is attested by the fact that fully four million persons annually receive medical attention at dispensaries. Singularly, no single volume has been written giving due consideration to the principles of dispensary organization. Davis and Warner have offered a most valuable book discussing these fundamental principles with an elaborate discussion of the technic of dispensary building, organization, management, records, follow-up systems, efficiency tests, and that most important subject, finance. Special types of dispensaries, particularly, the public health dispensary and the health center, the specialty center and the pay-clinic, receive most thoughtful discussion.

The fifth section, devoted to the public problems centering around dispensaries, is particularly valuable in the light of the possibility of medical reconstruction due to war experiences. The relations of the dispensary to the medical profession on the one hand, and to the large public clientele on the other are carefully considered, particularly in connection with the organization of dispensary service for communities. A splendid bibliograph, suggestions for by-laws and rules for a dispensary, and a statement of the Massachusetts Dispensary complete the content of the book.

No other book states so clearly the dispensary problem or is filled with so numerous suggestions of a constructive character as the one reviewed. It should be read and given its merited attention by physicians, laymen, public health officials, and philanthropists who see in the dispensary a social institution for the improvement of civic health.

Information for the Tuberculous. F. W. Wittich, A.M., M.D., Instructor in Medicine and Physician in Charge Tuberculosis Dispensary, University of Minnesota Medical School; Visiting Physician, University Hospital, Minneapolis, Minnesota. St. Louis: C. V. Mosby Company, 1918. Octavo of 144 pages. Price $1.00.

The care of the tuberculous is largely a matter of personal hygiene and personal practice. This is recognized by the author, himself at one time a sufferer from tuberculosis, who in a simple, practical manner has created a handbook for the use of the afflicted, giving adequate information to demonstrate how best to use time and energy in the fight against tuberculosis. The characteristics of the book are a delightful optimism, a practical cheerfulness, and a common sense point of view which needs but be imitated by the tuberculosis sufferer in order to have a better chance of a successful conquest of his disease.

The Orthopedic Treatment of Gunshot Injuries. Leo Mayer, M.D., Instructor in Orthopedic Surgery, New York Postgraduate Medical School and Hospital, with an introduction by Col. E. G. Brackett, M.C.N.A., Director of Military Orthopedic Surgery. 12mo of 250 pages, with 184 illustrations. Philadelphia and London: W. B. Saunders Company 1918. Cloth, $2.50 net.

War has demonstrated many serious problems connected with the treatment of gunshot injuries. Fortunately Dr. Mayer has not felt called upon to write a complete book on orthopedic surgery, but has realized the necessity of emphasizing some of the fundamental principles and rules so essential in the treatment of war injuries. He has properly stressed the prevention and cure of deformities due to gunshot injuries. Obviously, sprains and dislocations play no part in the subject matter which deals mainly with fractures and injuries to joints, bones, and injuries to nerves, muscles, tendons.

The subject matter is divided into two parts. The treatment given at the front which has for its end the stopping of bleeding, and the proper fixation of the injured part. The second section deals with surgery at the Base Hospital where the aim is to discontinue fixation and restore motion and complete function.

The practical experience of the author, and the clearness of his presentation make it an unusually useful volume, not merely for the military surgeon, but for those whose field of surgery lies in the industrial world where severe injuries of bones and joints are not infrequent. Especially valuable for civil surgery are the chapters relating to treatment of the amputated, and the discussion of the aims and organization of the Orthopedic Reconstruction Hospital. The discussion of artificial limbs is most timely, and indicates the importance of this subject in surgical care. The inherent excellence of the book is generally spread throughout the subject matter and every chapter is full of suggestions, rational and practical, which merit careful study and application in the development of the orthopedic work of this country.

Progress in Surgery

A Résumé of Recent Literature.

Displacement of the Appendix. G. F. Straub and G. C. Milnor. *Journal American Medical Association*, January 11, 1919.

Reports an interesting observation of an extreme displacement of the appendix, which was discovered with some difficulty in the operation. "The cecum was found to be drawn upward about 3 inches out of position, while the transverse colon formed a rather long loop hanging down below the umbilicus, without omentum. It was this loop constantly appearing in the wound that led us astray in exactly locating the appendix. The base of the appendix was finally found 3½ inches above McBurney's point, not postcecal, but anterior and adherent to some organ above, pulling the cecum upward and dragging the ileocecal junction with it." A second incision had to be made after the first McBurney incision to free the tip of the appendix and bring it down and allow the cecum to recover its normal position. The appendix was 6 inches long, normal in thickness, and aside from two strictures and a moderate degree of chronic congestion, was apparently normal. The authors explain the condition by an arrest in fetal development, probably around the eighth week of embryonic life.

Pericholecystitis. J. W. Churchman, *Journal American Medical Association*, January 4, 1919.

Churchman calls attention to the gastric symptoms that may be due to inflammatory conditions about the gallbladder and the consequent adhesions. He gives the points in regard in several cases observed. The adhesions are not the light veil-like structures often met with, but thick, firm, extensive adhesions of the gallbladder to the stomach, the liver, the colon or to the abdomminal wall. The symptoms may be apparently indicative of gastric ulcer, and the importance of these cases is impressed on us that in patients in whom clinical examination does not reveal gastric ulcer or gallstones, pain in the upper quadrant of the abdomen or stomach region may be solely due to such adhesions. If the clinical picture represents the late results of a previous cholelithiasis, it is another argument for the operation of cholecystectomy when gallstones are found in the bladder, and Churchman believes it is the operation which should be done. There is no excuse for injury to the common duct if the cystic duct is fairly freed before it is clamped. While the author does not think that such symptoms insure the diagnosis of adhesions, they call for an exploratory operation as a routine measure.

Meckel's Diverticulum—Report of Cases Causing Intestinal Obstruction. R. Graham, *The Canadian Medical Association Journal*, November, 1918.

Graham reports four cases, with two recoveries; he concludes:

1. In post-operative cases showing distension late in their convalescence, one should bear in mind the possibility of a Meckel's diverticulum being a causative factor, considering the fact that they occur in two per cent. of autopsies.

2. The palpation of tense coils of intestine as pointed out by Starr is an aid in localizing the obstruction.

3. The history of no previous illness and the history of no umbilical discharge is no criterion that the patient has no diverticulum remaining.

4. If a patient after operation has had an uneventful convalescence for three days, and then develops abdominal distension, acute ileus is scarcely to be considered and some other cause must then be looked for.

5. Intestinal obstruction caused by Meckel's diverticulum seems to come on more gradually and is more intermittent than most acute obstructions.

Spastic Ileus. Leonard Freeman, *Annals of Surgery*, August, 1918.

Spastic ileus is a localized contraction of an intestinal coil, the mechanism of which is not clearly understood, but which is probably of some reflex neurogenous character. It is not always possible to exclude a mechanical condition and operation is done often under a mistaken diagnosis. When the condition is once recognized antispasmodic remedies are indicated.

Rupture of the Uterus. Robert Y. Sullivan, *American Journal of Obstetrics, Etc.*, October, 1918.

There are four observations which when existing at the same time, according to Sullivan, suggest impending rupture. 1. Strong pains without appreciable advancement. 2. Exquisite tenderness on palpation to the degree of actual hysteria. 3. Undue bulging in the lower uterine fold during pain with subsequent relaxation. 4. The sensation of tearing muscle fiber when the abdomen is palpated during labor. To this may be added tonic cordlike tension of the round ligaments, especially the one on whose side rupture is threatened. The great restlessness, hysteria, disturbed mental state of the patient is characteristic. She rolls about in frantic agony. For the greater frequency of uterine rupture during labor two factors are principally responsible. 1. The greater resort to abdominal Cæsarian for a variety of relative indications and 2. The indiscriminate use of pituitrin. On the other hand, adequate study of all obstetric cases before labor, especially *internal pelvimetry*, will reduce the frequency of uterine rupture by instituting appropriate operative treatment in cases complicated by tumors, overdistended uteri, oversized child and diseased uteri.

The Positive Wassermann Reaction Which Changes to a Negative at the Termination of Pregnancy. Maud L. Menten, *Amer. Journ. of Obst. & Dis. of Children, Etc.*, October, 1918.

Menten found that in over half the cases tested for Wassermann reaction before and after labor the positive Wassermann changed to a negative reaction. In a series of 357 patients 13.45 per cent. give the positive Wassermann reaction several days to weeks antepartum. In 26 of these positive cases the blood was tested several days to two weeks postpartum. Of these 14 were negative and 12 positive. It is not settled whether the positive reactions invariably indicated a syphilitic infection or whether possibly the blood of a pregnant woman contains those elements which simulate the Wasserman reaction. Of the 12 positive cases the histories would corroborate the diagnosis of lues in at least three cases.

The Funnel Pelvis. With a Report of One Hundred and Six Cases. Hervey Williamson, *Amer. Journ. Obstetrics, Etc.*, October, 1918.

Williamson lays stress on the importance of estimating the transverse diameter of the outlet in taking pelvic measurements during pregnancy. A transverse diameter of 5.5 cm. or below is an absolute indication for Cæsarian section. Normally this diameter is 11 cm. Williamson considers a pelvis of the funnel type when the transverse diameter of the outlet measures 8 cm. or less. As a result of his study of 106 cases of funnel pelvis, Williamson concludes that abdominal Cœsarian section should be performed at or just before term in cases of extreme outlet contraction. In moderately contracted pelves the indication of premature labor offers a safe method of preventing a difficult delivery with deep perineal tears. Pubiotomy is advisable in certain cases where forceps have failed. A transverse diameter of 7.5 cm. with a 7.5 cm. posterior saggital, is consistent with spontaneous labor. The funnel pelvis is the usual cause of deep perineal tears.

Relation of Syphilis to Abortion. Fred. L. Adair, *American Journal of Obstetrics, Etc.*, November, 1918.

Syphilis according to Adair is not the potent factor in producing the termination of pregnancy during the first trimester, as in thirteen of his syphilitic cases there were 74 pregnancies with but 23 abortions or 1 in 3. The same proportion obtained in his unsyphilitic cases. On the other hand, about 20 per cent. of the premature infants gave positive evidence of luetic infection. Of the mothers who had stillbirths, 10 per cent. gave positive Wassermann reactions. Of the stillbirths in the hospital 12 per cent. were proved syphilitic. Two of the malformed infants were born to syphilitic mothers, which is a higher ratio for those having syphilis than for those who did not. Syphilis was also proved in two out of five cases of hemorrhage of the new-born.

The Heart of a Pregnant Woman. L. Burckhardt, *American Journal of Obstetrics, etc.*, December, 1918.

An early diagnosis of a heart lesion is essential for successful therapeutics. The history of the case is important: Menstrual disturbances, aversion to exertion, vasomotor disturbances, a multipara who has never regained her full strength after a previous delivery, pyeletes, other forms of sepsis, and toxemias should be looked upon as suspicion. To depend on marked objective changes in the heart and the general system means the loss of valuable time. Low pressure, the absence of accentuation of the pulmonic or aostic second sound, the displacements of the cardiac outlines, ana the change in intensity of murmurs over the ostia, are of greatest importance. The frequent simultaneous occurrence of a toxemia and a cardiac disturbance, caused perhaps by the same factor are important: relatively low pressure, with a steadily increasing amount of albumin, of blood nitrogen, granular casts and blood cells presages early collapse. Drastic measures, if unavoidable, include prolonged and absolute rest in bed, the use of opiates, and larger doses of digitalis, all of which interfere with the essential metabolism. Impregnation should be prevented if possible; if conception has occurred, it should in all but the severest treatment be carried to term. Rest and exercise, neither half-heartedly, should be prescribed. Blood pressure readings especially between the thirty-fourth and thirty-fifth week when daily observations are necessary in order to determine the proper time of interference and when patients should be confined to bed, assist greatly in controlling the patient's work. Settling usually gives a considerable amelioration of symptoms and patient may be given more liberty. Offending tonsils or teeth should be removed; any nasopharyngeal or dental work should be attended to. And last but not least, digitalis to regulate the work and rest of the heart.

Ureterovesical Anastamosis. Anders Peterson, *Journal American Medical Association*, December 7, 1918.

Peterson reports experiments and clinical observations on the effect on the kidney of ureterovesical anastomosis. A brief historical sketch of the operation is first given, and the different types of technic, those of Coffey, Stiles, Furniss and Mann being described. The object of the experiments and observations was to evolve a technic for the reimplantation of the ureter into the bladder, and to study the effects on the kidney and ureter. Twenty-four experiments were made on dogs, the majority being unilateral implantations, and the technics and results are described. In view of the end result, Peterson says, and the simplicity of the operation, the modification of Stiles' technic used seems most suitable in ureterovesical anastomosis. The original technic consists in entering the lumen of the bowel through a stab wound and approximating the intestinal wall without further dissection over the ureter. The modification consisted in splitting the anterior aspect of the wall of the ureter for about one-fourth inch; no suture except the anchoring suture was permitted to enter the wall of the ureter. Care was taken to avoid any injury to the proximal end of the severed ureter, and no forceps were placed over the end. Forceps were placed on the side of the bladder, and the ureter cut with a thin scalpel about 1 cm. above this clamp. While the sutures infolding the ureter in the wall of the bladder were being tied, a thyroid needle was used as a seeker in order to avoid any undue compression on the anastomosis. There were six complete successes in the eight operations. The experiments are reported in detail and summarized in tables. A clinical report of twenty-one cases in the Mayo Clinic is also made and discussed, and the following are the author's conclusions: "1. From experimental and clinical observations, it is obvious that a normal or almost normal kidney and ureter should result following the implantation of the ureter into the bladder. 2. The utmost care to minimize the operative trauma must be observed. 3. The placing of forceps over the end of the ureter should be avoided. 4. No suture should enter the wall or lumen of the ureter other than the anchoring suture placed in the split extremity of the ureter; and the approximation of the wall of the bladder must be accomplished without undue compression. 5. When marked dilatation of the ureter has occurred prior to surgical interference, and when it is necessary to implant the ureter under tension, a successful result is very doubtful, and ligation is preferable to any effort of implantation."

Recurrence of Stone in the Kidney. Charles R. Robins, *Surgery, Gynecology and Obstetrics*, September, 1918

Robins quotes the conclusions of Cabot and Crabtree: "On the basis of these cases, we can only say to the patient that the risk of operation is small; that the danger of progressive destruction of the kidney by the stone, if it is left, is considerable; that it depends somewhat upon the age, undoubtedly somewhat upon the method of operation and the skill with which it is carried out, but clearly upon an entirely unknown factor—the liability or the ability of that particular kidney to form concretions."

Malar Bone Fracture. A. E. Rockey, *Journal American Medical Association*, January 4, 1919.

This describes a method of diagnosis of fracture of the malar bone, which may vary in the extent of the depression, location of fracture line and complicating fractures elsewhere according to the force and direction of the trauma. The occasional occurrence of total or partial anesthesia in the area of the intraorbital nerve shows clearly that the fracture line runs through the foramen of exit. The orbital plate is also involved and perhaps the temporal process, and when the depression is slight, the deformity may not appear until the swelling goes down. He has devised a method to detect even a slight depression, as follows: "Two straight wooden applicators are placed, vertically at the outer edge of the orbit from the prominence of the cheek bone upward. . . . If depression exists, the difference in angle is obvious. The swelling may be pushed out with the finger tip and the end of the applicator given a firm rest on the bone. The bone may usually be easily raised into position by grasping it through the skin with heavy tenaculum forceps. The ordinary towel clips at hand in every surgery answer the purpose admirably. A general anesthetic must be given. Gas does well, as the operation is short." The operator must satisfy himself both by palpation and repetition of the test that the normal position has been obtained. As a rule, the bone stays well in place, but care should be taken to protect the cheek from external pressure until healing is complete.

Concerning the Symptoms Attributed to Lesions of the Sacro-Iliac Joint. Robert B. Cofield, *American Journal of Orthopedic Surgery*, November, 1918.

The symptoms occurring in acute and chronic sacro-iliac lesions, as well as many of the sciaticas, are to be explained by sprains of the joint, the spasmodic action of the posterior musculature of the body and the sequelæ resulting therefrom. Hitherto manipulation has been practised in an empirical way. When performed with a definite idea of restoring the retracted muscles to a normal tension and the breaking down of periarticular adhesions, the efforts are guided by more intelligence and foresight. On account of the frequent occurrence of anomalies of the spine and pelvis in this region, an x-ray examination can only be of positive value when checked up by a subsequent examination after a cure is effected.

The Results of Primary Excesion for Wounds of the Elbow-Joint. A. Eisdell Moore, *British Journal of Surgery*, October, 1918.

Extensive primary resection always results in a flail joint. Limited excision gives satisfactory results. If the bone is comminuted muscle-fascia flaps should be carried in to cover the bone surface as is done in an arthroplasty. Post-operative support of the forearm is essential. Rest is more important than early movement. In certain cases of flail joint capsulorrhaphy does good.

Clinical Observations Concerning Malignant Tumors of the Jaw. Albert J. Ochsner, *Annals of Surgery*, August, 1918.

Malignant growths seem slower in making metastases in the jaws than in many other parts of the body. Tumors in the lower jaw are followed more frequently by metastases. Recurrence is less likely to follow a cautery removal, than a knife removal of the growth. The mortality of primary operations is almost nothing and the results are good; in late, or secondary, operations the opposite is true.

In sarcoma it is best to excise the entire jaw on the side of its occurrence. In carcinoma deep destruction with cautery seems to bring better results.

Recurrent Dislocation of the Lower Jaw. John Bapst Blake, *Annals of Surgery*, August, 1918.

A new operation is suggested. The coronoid process, or the insertion of the temporal muscle into it, should be tied up to the anterior part of the zygomatic arch. This may be done with silver wire, or with slowly absorbable suture material. The operation, though not so easy of execution as of description, is less difficult than the attack on the temporo-maxillary joint, is much more logical, and more mechanically efficient; it does not injure important structures, and the scar is not disfiguring. The result should be 100 per cent. success.

An Observation of the Carrel-Dakin Method of Treating Chronic Wounds in an Orthopedic Centre in England. John Dunlop, *American Journal of Orthopedic Surgery*, December, 1918.

Old infected wounds can be cleaned up and healing can be quickened by this method. Complete sterilization is difficult and was never accomplished so that secondary suture could be done. It is difficult to prevent sinus formation in the through-and-through wounds, especially when sections of bone are absent.

Drainage of Chest Wounds. M. A. Blankenhorn, *Journal American Medical Association*, December 14, 1918.

Blankenhorn remarks on the difficulties caused by open pneumothorax in drainage of chest wounds, especially in those inflicted in war. Patients operated on early and left with open drainage have always done badly, and those not operated on have developed empyema or become septic. Patients operated on at a selected time and closed again have done well, but it is not always possible to provide operation and closure at the critical hour, and many cases are seen, especially at the base which demand drainage. In such a case the pleural membrane, respiration and circulation are relatively normal, but when an open pneumothorax is produced, it exposes to infection, and impaired respiration and circulation render the situation more serious. It is certain that the pleural membranes when approximated resist infection better than when separated. Mechanical difficulties have been the greatest obstacles in the way of closed drainage. The trouble is usually in making an anastomosis between a rubber tube and the chest wall. At the Lakeside Unit they have used the Brewer tube with very satisfactory results. It is a rubber tube with flange arrangements to be inserted through a rib that has been resected from ½ to ¾ of an inch. "It is not necessary to suture the tissues tightly around the tube, for an air tight junction can be made with adhesive tape and dressings together with the flanges of the tube. To maintain a continuous negative pressure on the chest, a stiff rubber bulb is collapsed and connected to the free end of the tube by a glass connection. In civil practice we were using Politzer bags, but at present the rubber bulbs of automobile horns are more available. At operation the surgeon can usually insert the tube through his stab wound with very little inrush of air and by manipulating the flanges of the tube prevent a pneumothorax of any appreciable size from forming. What air has entered the chest can be promptly pumped out with the bulb, a large surgical clamp on the tube being used as a valve. By keeping the bulb collapsed and dependent below the wound . . . one can make the lung expand normally and at the same time provide a liberal drainage of the pleural sinus." The lung was found to come down very readily and breath sounds were audible almost at once over the space once occupied by fluid. In all cases the tube remains tightly in place for five days at least, and the lung adherent to the chest wall thus preventing pneumothorax. After the second or third day irrigations at low pressure can be made through the tube, being careful not to tear the lung from its new adhesions, and coughing should be prevented for the first five days. When the chest has been explored for a foreign body and drainage is found necessary it is best to make it through a separate opening, especially if there is contamination of the surgical wound by the wound of entry. In chronic empyemas after gunshot wound, or when there has been considerable fibrosis of the visceral pleura, a system of closed drainage with suction will expand the lung better than blowing exercises, but the methods can be combined. In chronic cases where granulations have formed around the wound, the tube can be removed, cleaned and replaced, and an air tight junction made again with the help of adhesive tape.

Postoperative Thoracic Drainage. Willy Meyer, *Annals of Surgery*, August, 1918.

Kenyon's method is useful for post-operative thoracic drainage. It is simple, safe, and easy of execution. It permits of satisfactory observation of the quality and quantity of the effused fluid. This method fulfills Sauerbruch's demand that the chest be water- and air-tight after operations.

Diseases of the Costal Cartilages. Alexis V. Moschcowitz, *Annals of Surgery*, August, 1918.

Cartilage exposed in an infected wound does not heal, and practically always forms a sinus. A cure of such a condition is only obtained by removing the entire extent of the cartilage, so that no cartilaginous tissue is exposed in the wound. Suture is then made with none or filiform drainage.

Tetanus. M. D. Rojas, *Journal American Medical Association*, December 28, 1918.

The report of a case of tetanus treated by injections of tetanus antitoxin and potassium bromid and chloroform inhalations without improvement, for five days, followed by success with the Baccelli treatment of 3 per cent. phenol injections near the spinal roots every two or three hours, rectal feeding and morphin. Later potassium bromid and chloral hydrate were substituted for the morphin, after the muscular rigidity had disappeared. Still later, tonic treatment was given. The total time that elapsed from beginning of treatment, May 24, till discharge, apparently in good condition, July 19, was fifty-six days. During the last ten days, the treatment was mainly tonics, and free diuresis, with attention to the bowels. From the case, Rojas deduces that antitetanic serum, of which 68,000 units were used altogether, is of doubtful value after the toxin has been fixed in the cells. Baccelli's phenol treatment undoubtedly neutralizes some of the toxin, and possibly inhibits, somewhat, the growth of the bacillus. Diuresis stimulated by fluid injections and the use of hexamethylenamin is useful in diminishing the toxin products and eliminating them.

Delayed Tetanus. W. L. Whittemore, Kent, England. *Journal American Medical Association*, December 14, 1918.

Whittemore reports two cases of tetanus, in which after apparent recovery there occurred, at a later date, similar though milder attacks of the same disease. These men were wounded one three and one-half months before the onset, and the other nine months previous. In the second case, three months after the original wound was received, an operation was performed in the neighborhood of the healed wound which may have caused an earlier appearance of the disease. In both local symptoms and signs appeared two and three weeks before the secondary generalized disease. Both patients were treated with antitetanus inoculations, both shortly after the original wound, and during the attack. Eye symptoms were present in both cases, and in one a bad keratitis in the other iritis and conjunctivitis. Whittemore concludes from these cases that the incidence of traumatic tetanus may be markedly delayed and that relapses may occur after such attacks. The premonitary symptoms are localized in the neighborhood of the wound. The relapses are not so long or severe as the original delayed attack, which may be followed by muscular symptoms for weeks and months, and these cases raise the question whether excision of the focus may not be advisable, even when there is no foreign body included, as a precautionary measure against tetanus.

Treatment of 420 Infected Wounds Under Battle Conditions Arriving on an Average of 58 1/3 Hours After Injury Without Previous Surgical Treatment. Lt. Col. G. W. Crile, *Canadian Medical Association Journal*, November, 1918.

Crile describes the method of preparation of the patient and all the immediate measures necessary, viz.: removal of devitalized tissues, anticipatory incisions to prevent phlegmons, etc. To combat infection, five methods were employed: 1. Surgery, plus dry gauze—no antiseptics. 2. Flavine. 3. Dichloramin T chlorocosane. 4. Loright's hypertonic pack. 5. Alcohol.

Of the 420 cases 67 were marked for delayed primary suture; 44 superficial wounds were immediately sutured. Of the 44 immediate sutures, all were successful; of the 67 delayed sutures, 91 per cent. healed primarily. Of the total number 93 were compound fractures. There were four deaths, and there was no case of bacteremia or septicemia. There did not seem to be any appreciable difference whether an antiseptic was or was not used: the results with each were practically uniform.

Injuries of the Peripheral Nerves from the Surgical Standpoint. H. S. Soutar and E. W. Twining, *British Journal of Surgery*, October, 1918.

In operating for injuries of the peripheral nerves, it is essential that an accurate idea of the anatomy of the region be had; of the condition of the nerve which is to be repaired; and of the method by which repair is to be accomplished and the latter should be the simplest possible. Excision of the scar is necessary into healthy fibers, and end-to-end suture is best. The physical treatment should be based on a definite routine, modified in accordance with the special requirements of the case. For this a good organization is necessary.

Treatment of "Essential" Facial Neuralgia by Local Alcoholization. J. A. Sicard, *Boston Medical and Surgical Journal*. Sept. 19, 1918.

A long and rich experience with this method convinces Sicard that surgery has no longer any *raison d'eare* in the treatment of "Essential" facial neuralgia. Sicard has tried many substances but finds that alcohol in strengths of 70 to 95% is the best. Sicard describes carefully the anatomy of the fifth nerve and the technic of injecting the various faramina of exit of the various branches. The article also is full of details concerning the post-operative course and accidents that are liable to occur. His results have been truly remarkable. The injections as a rule require repetition at the end of a year or 18 months, sometimes to the extent of a half-dozen. Often a single injection brings about a perfect cure and it is rare that more than six injections are necessary.

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SLIDING HERNIA: WITH REPORT OF TWO CASES INVOLVING THE URINARY BLADDER.

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A comprehensive discussion of sliding hernia of the urinary bladder must necessarily include other types of sliding hernia, because the pathology in each is practically identical; in lesser degree it must also embrace consideration of hernia in which a portion of the bladder occupies the true hernial sac, although the sliding process may form no part of the existing pathology. It seems pertinent to remark at the outset that few instances of sliding vesical hernia have been recorded.

In this paper I shall purposely omit discussion of details concerning the presumed etiologic factors primarily responsible for the production of the various types of sliding hernia. It is admitted that at best the etiology is uncertain and existing information therefore indefinite, although the secondary mechanical factors and their results are fairly well understood.

Vesical Hernia: So far as can be ascertained from a study of the literature, the first accurate description of hernial extrusion of the bladder must be accredited to Albucasis, who lived and practiced in the eleventh century, A. D.; the subject is later rather extensively discussed by Sala, de Chauliac, and many other surgical writers. However, to the classic monograph by Verdier published in 1769 we are indebted for the majority of the early anatomic and pathologic data concerning this particular type of hernia. In his book written in 1804 Sir Astley Cooper mentions only four instances of vesical hernia, two observed in living subjects and two at necropsy. Probably because of its rarity this type of hernia is practically ignored by most modern writers. Of four thousand two hundred and eighty-five herniotomies performed in one of the largest American hospitals, a portion of the bladder was found in the hernial sac in only eight instances.

There are recognized three varieties of vesical hernia, viz., (a) the extra-peritoneal, where a portion of the viscus protrudes alongside the sac of an ordinary hernia, or rarely independent of any hernial sac, (b) the intra-peritoneal, where a portion of the viscus appears in the sac covered with peritoneum, and (c) the para-peritoneal, where a portion of the viscus only is covered with peritoneum of the sac. In their classification and description of cystocele, in its relation to the various types of hernia, the following division is made by some of the older writers on the subject: (a) cystocele inguinalis, (b) c. abdominalis, (c) c. cruralis, (d) c. foraminæ obturatoriæ, (e) c. perineal, and (f) c. vaginalis.

Vesical hernia, whether sliding or otherwise, occurs with greater frequency in males than in females, in the proportion of about four to one. It is almost invariably encountered in inguinal hernia of the former and in femoral hernia of the latter. However, there have been some notable exceptions to this rule, as it has been occasionally observed in the herniæ of children of both sexes. The majority of instances recorded have been in middle-aged or elderly males the subjects of either direct or indirect inguinal herniæ.

Moschcowitz remarks that owing to its proximity to the inguinal region the bladder is frequently (one to three per cent.) found in oblique inguinal hernia, either alone or accompanied by other viscera; and for similar reason it is found more frequently in direct than in indirect inguinal herniæ. It must be remembered that the bladder is invested by peritoneum only on its posterior surface and vertex, and traction upon the sac of an inguinal hernia may cause the viscus to be extruded; but "this dislocation is merely an artefact, and cannot be called a hernia of the bladder in the proper sense of the word,—a hernia of the bladder is one in which the bladder forms part or the whole of the hernial contents."

Sliding Hernia: By the designation sliding hernia" or the so-called *hernia par glissement* of the French, is meant a hernia in which a portion or all of some of the slightly mobile pelvic viscera slide downward through the opening into the hernial sac, with or without intestine or omentum, the sliding organ necessarily being incompletely enclosed by peritoneum. It seems worthy of note, in this connection, that no viscus having a complete peritoneal investment can become the sliding part of a hernia. The sliding type is an exceedingly infrequent form of hernia regardless of what may be the sliding viscus; and the rarest form of all is sliding hernia of the bladder.

Sliding herniæ involving any of the pelvic viscera are, comparatively speaking, very uncommon. In a series of over five hundred herniotomies mentioned by Kirschner in 1911 the type was said to be "sliding" in fifteen instances. The author states that of these "ten were sliding herniæ of the sigmoid, and five were sliding herniæ of the cecum; all the cases occurred in adult male patients; in one case the sliding hernia was through the femoral ring, there being also present a right and a left inguinal hernia; in eight cases there were double inguinal herniæ, and in two instances these were complicated by femoral herniæ; undescended testicle was encountered once and hydrocele four times."

It is interesting to note Kirschner states that the sigmoid and cecum were the sliding viscera in the fifteen cases of sliding herniæ cited. While I do not wish to indulge in criticism nor in disputation, as already suggested, it is impossible of understanding how any viscus completely invested by peritoneum can become the sliding portion of a hernia; and it will be remembered that the small intestine, the sigmoid, the transverse colon and the cecum are entirely covered by the peritoneum or its reflections. Of course, where for some unknown reason these viscera become divested of peritoneum, or where because of anatomic defect they were originally not invested by the peritoneum or its reflections, the possibility of their becoming the sliding parts of herniæ is unquestioned. However, instances of that character must be so rare that when observed they may be regarded merely as anatomic curiosities; no such cases have been recorded in the literature so far as I am informed. Certain writers on the subject, in my opinion, have been prone to speak of the sigmoid and other portions of the large intestine without proper discrimination, or have been entirely mistaken in their anatomic division. Moschcowitz observes that "it becomes evident that only those parts of the large intestine can be involved in a sliding hernia which are not covered on all sides by peritoneum. It is manifest, therefore, in spite of assertions to the contrary, that the ascending and descending colon are the only parts of the large intestine which can enter into the composition of a sliding hernia. Most authors speak of the sigmoid flexure as the sliding organ, but this is manifestly incorrect."

The pathogenesis of the various types of sliding hernia as given by Moschcowitz may be worthy of interpolation in abstract form: He admits the difficulty of giving a short description of the phenomenon.

(1) Imagine that the peritoneal attachments of the descending colon have become loosened from the subjacent structures so that instead of being a fixed structure it moves easily on its bed, and the peritoneum about the internal inguinal ring is pulled downward; a hernial sac is thus formed and eventually the sigmoid flexure and descending colon will be pulled downward, the latter forming a part of the posterior surface of the sac. This may be termed a "sliding hernia by pulling."

(2) Imagine that the descending colon has been loosened as described and that pressure has been exerted just above its junction with the sigmoid flexure; the direction of this force must first be backward, then downward and inward, toward the internal inguinal ring; the anterior wall of the descending colon is thus approximated to the posterior wall which is pushed nearer the internal inguinal ring and finally outward behind the peritoneum into the inguinal canal, thus producing a true hernia without involvement of the peritoneum, *i. e.*, a sacless hernia; in contradistinction to the first variety mentioned, this may be termed a "sliding hernia by pushing."

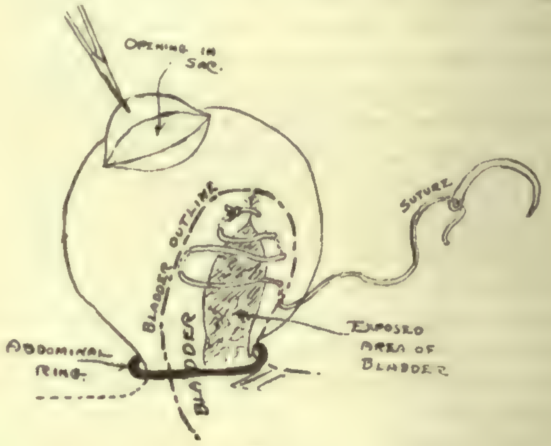

Fig. 1.

The author states that both types occur with about equal frequency, but they differ in several respects; *e. g.*, herniæ by pulling are usually very large; herniæ by pushing are very small; herniæ by pulling usually have a large sac; herniæ by pushing have no sac; in the herniæ by pulling the intestinal nutrient vessels are usually pulled downward; in the herniæ by pushing the nutrient vessels need not necessarily be in the hernia.

In general, says the author, the broader the uncovered area of a viscus (by peritoneum) the greater the likelihood of its constituting the sliding part of a sliding hernia; and therefore on theoretical grounds one may divide the abdominal organs, according to their likelihood of entering into the formation of a sliding hernia, into the following groups:

Always.—Ureter.

Never.—Ovary, stomach, liver, spleen, transverse colon, cecum, omentum.

Rarely.—Sigmoid flexure, small intestine, uterus, fallopian tube.

Likely.—Ascending colon, descending colon, broad ligament, urinary bladder, appendix.

"Finally, I wish to state that, by the above description, I refer only to the sliding organ, which has nothing to do with the hernia. In other words, we may have combinations; thus, for instance, there is nothing to prevent the ovary from being in a sliding hernia of the descending colon; in such a hernia the ovary is merely an accidental inhabitant of the hernia, but only the descending colon is the sliding part. Assuming the correctness of this pathogenesis of sliding hernia, it becomes self-evident that the terms hernia of the large intestine, and sliding hernia, are by no means synonymous. This mistake is only too frequently made in medical literature" (Moschcowitz).

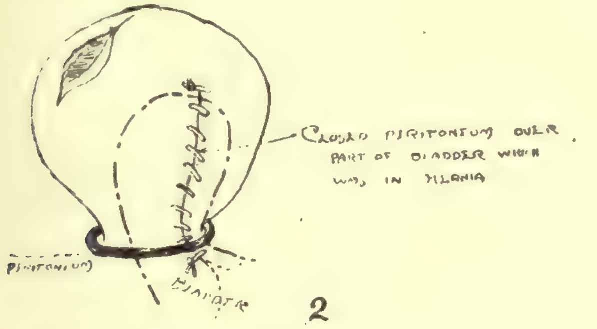

Fig. 2.

In summarizing the varieties of sliding herniæ the author pertinently remarks:

(a) Cecum: The cecum has a complete peritoneal investment and can therefore never be the sliding part of a sliding hernia; it is merely prolapsed into the hernial sac. (This does not refer to the *hernie par bascule* of the French.)

(b) Ascending colon: The ascending colon is found in inguinal hernia almost without exception as the sliding viscus; in large herniæ the pathogenesis is explained by a "pulling" mechanism the ascending colon being frequently accompanied by other viscera,—cecum, appendix, small intestine, omentum; in small herniæ the pathogenesis may be explained by a "pushing" mechanism and may be entirely devoid of a sac.

(c) Transverse colon: The transverse colon has a complete peritoneal investment and is therefore never the sliding portion of a sliding hernia.

(d) Descending colon: With slight modifications the remarks on herniæ of the ascending colon apply equally to those of the descending colon.

(e) Sigmoid flexure: Most writers speak of herniæ of the sigmoid flexure as a "type example" of sliding hernia; obviously the sigmoid (excepting under unusual conditions) cannot form the sliding part of a sliding hernia.

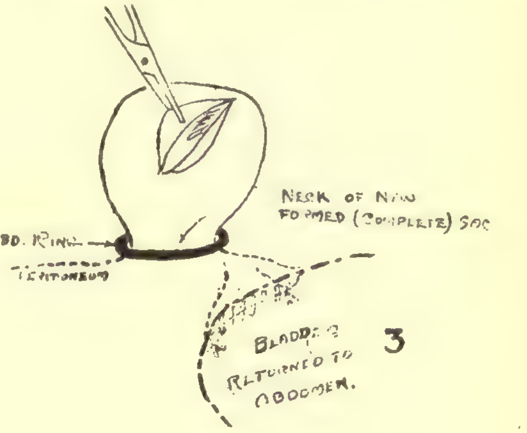
Neck of new formed (complete) sac
Ab. Ring
Peritoneum
Bladder returned to abdomen.
3

Fig. 3.

Sliding Vesical Hernia: As already intimated, the rarest type of sliding hernia is that in which the bladder constitutes the sliding viscus; in fact, it is so infrequently observed that many authors doubt the existence of such an entity, and therefore ignore the subject entirely. One of Sir Astley Cooper's cases (1804) was undoubtedly a sliding vesical hernia which was unrecognized, as will be noted from his description reproduced verbatim: "When the cavity of this hernial sac was laid open by incision, both omentum and intestine presented themselves; the bag in which they were contained was complete, and the bladder was still concealed. I then threw air in by the urethra in order to inflate the bladder; and immediately the bladder began to swell, not only in the pelvis but also in the the scrotum behind the hernial sac, until it became as large nearly as an ostrich's egg. The bladder was situated behind the peritoneal sac, to the posterior part of which the anterior surface of the viscus closely adhered; posteriorly it was connected by cellular membrane to the scrotum and to the tunica vaginalis of the cord. On tracing it upward it was found to ascend through the external abdominal ring into the inguinal canal, where it maintained the same relative situation to the cremaster and spermatic vessels as in the scrotum; it thence descended through the internal abdominal ring into the pelvis. It is almost needless to observe that both rings, especially the inner ring, were much dilated."

This is the first comprehensive description of sliding vesical hernia which I have been able to locate in the literature, although the exact nature of the pathology escaped the recognition of this astute and careful observer.

The comparative frequency of sliding vesical hernia cannot be even approximately estimated. In Kirschner's fifteen cases of sliding hernia noted in a series of over five hundred herniotomies the bladder is not mentioned as the sliding viscus; in the eight cases of vesical protrusion in four thousand two hundred and eighty-five herniotomies already cited, no instance of sliding hernia is mentioned; in a total of three hundred and fifty examples of vesical hernia cited by Bruner, Curtis and others, no mention is made of the sliding type; and the same is true of one hundred and ninety-two cases collected by Cheesman.

During the last twelve months three cases of sliding hernia have come under my personal observation; in two the sliding viscus was the bladder, in the third a small segment of the descending colon without peritoneal investment was found in the hernial sac. All three patients were subjected to surgical treatment with satisfactory results. No other cases of sliding vesical hernia have been encountered in my surgical experience extending over a period of more than twenty-five years. The details concerning these two cases will be reported herein.

Diagnosis and Treatment: It is regretfully admitted that, because of lack of characteristic symptomatology, accurate ante-operative diagnosis of sliding hernia, regardless of what may be the sliding viscus, is sometimes impossible of accomplishment even by the most competent and experienced clinician; and in consequence serious accidents have happened during surgical treatment. The sliding viscus may remain unrecognized or be mistaken for the hernial sac and incised, thus inducing a fatal termination from hemorrhage and peritonitis; it has even been included in the ligature and excised during herniotomy, with a similar result.

The observation seems important, in this connection, that strangulation of the sliding viscus is impossible, although the other hernial contents frequently become strangulated as occurred in one of my cases. This is not difficult of understanding when one studies the formation of sliding hernia and the relation which the ring bears to the blood supply of the sliding portion of the sac contents. Reduction of the sliding viscus by external manipulations is a physical impossibility, and mechanical treatment is of no avail. Thus under the erroneous diagnosis of simple hernia much damage has been done by the application of a truss in sliding hernia involving the intestine as well as the urinary bladder.

Strange as it may appear the diagnosis of sliding hernia may be difficult even after the overlying tissues have been incised, and this applies with equal force whether the sliding viscus be a portion of the intestine or the urinary bladder. The topography may be so changed as a result of the existing pathology that recognition of the various tissues may be exceedingly difficult; the intestine or vesical wall may be mistaken for the true hernial sac; likewise the bladder may be mistaken for the intestine, and vice versa; the prevesical fat may closely resemble omentum. "Vesical protrusion has been mistaken for the true hernial sac, for a lipoma, for pro-peritoneal fat, for omentum, for a cyst, for a sacculation of the colon, and also for a second hernial sac."

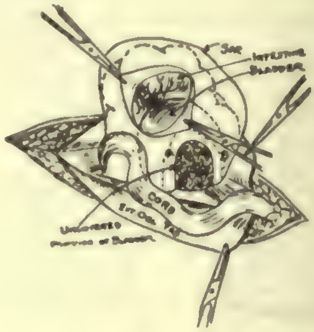

Fig. 4.

In a large proportion of the recorded examples of vesical hernia the viscus remained unrecognized until inadvertently incised during the operative steps. In the one hundred and ninety-two cases cited by Cheesman the vesical wall was recognized and avoided during operation in only forty-seven; in ninety-three it was injured "chiefly unintentionally!" In forty-nine cases mentioned by Finsterer the viscus was incised during operation in seventeen; in twenty-seven cases cited by Mandry the viscus was unrecognized and injured in twenty. In none of the eight cases previously referred to was a correct ante-operative diagnosis made, but the viscus was recognized during operation in every instance excepting one femoral hernia; in that case the bladder was extra-peritoneal, in the other seven it was para- or intra-peritoneal.

In Cheesman's collection of one hundred and ninety-two cases vesical symptoms were noted in only thirty. He suggests that the most constant and indicative clinical sign is a hernial tumor which subsides after micturition; pressure upon the protrusion may cause a desire to urinate, or even the expulsion of urine from the urethra. On the contrary, however, the majority of authors agree that there are no definitely characteristic symptoms, nor does the presence of the vesical hernia, *per se,* induce any serious discomfort to the patient. Where vesical extrusion occurs secondarily, *i. e.,* after primary herniotomy, the diagnosis should not be difficult as more than likely the hernial sac contains only the bladder.

With the idea that greater diagnostic accuracy might be thus insured, the administration of methylene blue for a few days prior to every herniotomy has been suggested. Unfortunately, however, this plan would probably prove futile unless the vesical wall happened to be incised during the operation, in which event escaping urine would be readily recognizable without the admixture of coloring matter. Moreover, to detect the discolored urine with any degree of certainty through the normal vesical muscularis would seem impossible under any circumstances. "Particularly is it prudent in relapsing herniæ to consider the possibility of vesical implication; should the hernia remain irreducible, its gradual increase and disappearance with filling and emptying of the bladder, would tend to confirm the diagnosis; under such circumstances filling the bladder with fluid and allowing it to empty, would remove all doubt" (Ostrom).

According to Roberts, vesical extrusion may be suspected if the hernial sac contains an unusual quantity of fat, if definite muscle fibers are recognized, or if difficulty is encountered in locating the neck of the true hernial sac. If the extrusion is considerable, the veins may be recognized after removal of the prevesical fat, and the introduction of a urethral sound or catheter will verify the diagnosis. The herniated portion will usually be found to the inner side or posterior to the true hernial sac, and not intimately connected with the spermatic cord. The pedicle may be traced downward behind the symphysis into the pelvis, whereas the pedicle of the hernial sac extends upward and backward. Detection of an additional mass to the inner side of the true hernial sac, the muscular character and smaller size of its pedicle, the presence of an inordinate amount of fat, fluctuation of the protruded portion and its color, are the most indicative diagnostic features. However, without exercising the precaution of introducing a catheter or sound, the diagnosis will usually not be perfected until the viscus is incised and the escape of urine noted. In some instances separation of existing adhesions may be impossible without vesical damage. The escape of a small quantity of urine need occasion no alarm, as it will not prejudice healing to any appreciable degree nor seriously militate against the ultimate favorable outcome, provided infection can be prevented and if drainage be practiced for a sufficient length of time (Roberts).

The foregoing remarks apply particularly to the diagnosis and treatment of vesical hernia, rather than the intestinal type, about which nothing further need be said. The following data are abstracted from the classic article by Moschcowitz already mentioned: The main point about herniæ of the bladder is the need to be constantly on the lookout for their presence. If there is an intraperitoneal bladder hernia, the prolapsed portion may be readily reduced. In para-peritoneal hernia it is well to remember that part of the sac is formed by the area of the bladder wall which is covered by peritoneum. In extra-peritoneal hernia of the bladder there is no sac to be ligated; it is merely necessary to be certain the case is not of the para-peritoneal type. Where a diverticulum of the bladder is encountered resection may be indicated. In operating for vesical hernia the peritoneum is carefully dissected from the bladder until that point is reached at which it appears the application of a ligature will leave no peritoneal diverticulum behind. Care is necessary in executing this step that the bladder be not injured. "The stripping off of the peritoneum from the bladder should be continued until the obliterated hypogastric artery, which can be readily recognized by its cord-like feel, is encountered." In any case the bladder after be-

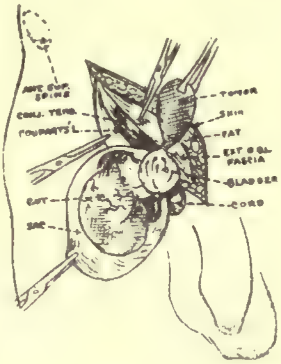

Fig. 5.

ing separated is pushed backward and held out of the way while the deep sutures are being tied.

The problem of dealing with sliding vesical herniæ is by no means simple, and unless one is prepared to cope with such a contingency considerable damage may be inflicted. Not infrequently the ureter has been divided before the nature of the pathology was recognized; and as already shown the vesical wall has been incised in the majority of the recorded cases during the operation. It seems probable that in certain instances where urinary fistulæ have developed following herniotomy a sliding vesical hernia was present and injury occurred because the nature of the pathology remained unrecognized. Such results naturally suggest that the greatest caution should be exercised in dissection and separation of adhesions in the performance of herniotomy, where it is even suspected that vesical complications exist.

The operative technic employed in the two cases to be reported is illustrated by the drawings which are herewith reproduced, some of which are original and others copied from the article of Kirschner published in 1911.*

Case 1. D. H., a male, aged thirty-eight, was referred to me April 7, 1918, by Dr. N. S. Howard of Harlan, Kentucky. The patient gave a negative family history for tuberculosis, Bright's disease, diabetes, and malignancy. Previous history: usual diseases of childhood; never since confined to bed because of illness.

Present illness and condition: The patient first noticed a right inguinal hernia four years ago, at which time he stated he experienced a weak, sickening sensation while carrying a heavy weight. The herniation rapidly increased, and when I saw him was complete and approximately twelve centimeters in diameter with the patient standing. He complained of an associated backache and stinging pain at point of the hernia when protrusion was marked; he had worn a truss unsuccessfully, due largely to the type of hernia, viz., indirect.

Physical examination: The patient was rather fleshy and wore glasses; head otherwise negative; chest negative. Right external inguinal ring open sufficiently wide to easily admit a thumb. Clinical diagnosis: right indirect inguinal hernia.

Urinalysis showed the urine normal excepting a slight trace of indican. Blood examination: hemoglobin, 80%; erythrocytes, 4,520,000; lecucocytes, 7,500. Systolic blood pressure 120 mm. Hg., diastolic 90.

Operation April 8, 1918, under nitrous oxide and ether anesthesia. Preliminary hypodermic of morphine 1/6 with atropine 1/150th grain. Pulse before beginning of anesthesia 90, volume good, respirations 22. During the operation pulse 100, respirations 35, both of good volume. There was no vomiting and cyanosis was slight. Puse 100 and respirations 22 when operation completed.

Operative technic: Incision 2 cm. above and parallel to Poupart's ligament; hernial sac found to contain fundus of bladder and loop of small intestine. The sac was incomplete at ring due to herniation of the bladder. A portion of the sac with its peritoneal fat was sutured over the uncovered portion of bladder which completed the sac. The bladder was then returned to the abdominal cavity and the intestine reduced. The new sac was closed by purse-string suture and the distal portion removed. The usual Bassini operation was performed with the addition of a suture above the internal ring, and transplantation of stump of the sac under the conjoined tendon. Plain catgut was used for suturing the peritoneum and skin; No. 2 chromic catgut mattress sutures for fascial closure. The wound was dressed with dry gauze held in place by adhesive strips. Operative diagnosis: right indirect inguinal hernia, with sliding hernia of the urinary bladder.

The highest temperature recorded after the operation was 100° F., with a pulse of 90, on the third day. Both receded to normal within the next few days. Convalescence was without untoward incident, the operative wound healed *per primam,* and the patient was discharged from the hospital well April 25, 1918.

Case 2. W. W., a male, aged fifty-eight, with a negative family history, was referred to me by Dr. C. F. Hancock of Jeffersonville, Indiana, October 16, 1918, on acocunt of a strangulated hernia. The patient stated that he had been in robust health until five years ago, at which time he weighed two hundred and sixty pounds. A right inguinal hernia had been present throughout adult life, and a truss had been worn until three years ago. According to the history subsequently obtained, the patient had been the subject of diabetes mellitus for the last four years. There was noted considerable itching and dermatitis about the feet. The fact that he was a diabetic subject was unknown to me until after the operation had been performed, which was really an emergency procedure.

Present illness and condition: Early in the morning on the day before admission to the hospital the hernia became irreducible and painful.

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*These two cases were reported in abstract before a meeting of the Jefferson County, Kentucky. Medical Society, December 2d, 1918.

The attending physician attempted, unsuccessfully, to reduce the intestine through the ring. During the next thirty hours the patient vomited almost constantly, bile and material feculent in odor being noted in the vomitus. Dr. Hancock was called at that time and, recognizing the serious nature of the existing pathology, sent the patient to the hospital for immediate operation.

Physical examination: Head negative except for soreness of the gums and absence of teeth. Heart and lungs normal. Abdomen not distended. A tense, elastic, tender mass was noted in the region of the right external abdominal ring. Clinical diagnosis: strangulated right inguinal hernia.

Operation October 16, 1918, under nitrous oxide and ether anesthesia. Pulse 120, respirations 22, when patient placed on the operating table. There was some vomiting during the executing of the operative steps. At close of operation the pulse was 120; respirations 24; volume of both good; no cyanosis at any time.

Operative technic: Incision in inguinal canal, extending downward over tumor-mass. On opening the hernial sac considerable effused fluid escaped. The sac was found to contain a loop of the ileum, a portion of the bladder, and attached to the summit of the contained bladder a solid tumor measuring 2 x 6 cm. It was noted that the spermatic cord was very dark; the hernial stricture was relieved by incision when the cord rapidly improved in color. The pedicle of the bladder tumor was clamped and the neoplasm removed, the stump being sutured with celluloid linen. The usual Bassini operation was then performed, with the addition of a stitch above the internal ring and transplantation of the stump of the sac under the muscle. Three mattress sutures of No. 2 chromic catgut were used to close the canal, and the same number employed for fascial closure. Plain catgut No. 1 was used for skin closure. The wound was dressed with dry gauze and adhesive strips. Operative diagnosis: strangulated right indirect inguinal hernia, sub-mucous bladder tumor.

Urinalysis, October 17, 1918: Odor of urine, normal; color, pale amber, clear; reaction, acid; specific gravity, 1025; albumin, a distinct trace; sugar, large amount present; indican, small quantity; acetone, positive. Microscopic examination disclosed the presence of pus and epithelial cells, an occasional blood cell, and a few hyaline casts.

As soon as it became known that the patient was a diabetic subject he was placed on the Allen treatment. Improvement was rapid, sugar promptly disappeared from the urine, and he made as smooth a convalescence as any patient I have ever operated upon notwithstanding our misgivings as to the ultimate outcome for the first few days after the operation.

Urinalysis, October 27, 1918: Odor of the urine, normal; color, amber; reaction, acid; specific gravity, 1020; albumin and sugar, negative; indican, a trace. An occasional epithelial cell was found; no casts present.

The second day after the operation the patient's temperature was 100.5° F., pulse 120. Both receded to normal the following day and remained so throughout convalescence. The patient was discharged from the hospital cured on November 1, 1918.

The bladder tumor was submitted for examination to Dr. Stuart Graves of the Pathological Department, University of Louisville, and his report follows: Gross description specimen consists of ovoidal mass 35 cm. long, pale to dark red, smooth and glistening. It has been split longitudinally and presents a reddish yelow, lobulated cut surface. Microscopical diagnosis: fat, with slight, acute inflammation.

Summary.

(1) Sliding hernia (*hernie par glissement*) involving any of the abdomino-pelvic viscera is infrequently encountered, and sliding vesical hernia is the rarest type known.

(2) Sliding hernia is noted with greater frequency in males than females in the proportion of about four to one; it usually accompanies inguinal hernia in the former and femoral hernia in the latter.

(3) Sliding hernia seldom occurs in young subjects of either sex, those of middle and advanced age being most susceptible; but there are strange exceptions to this rule.

(4) No viscus completely invested by peritoneum can become the sliding part of a hernia, in the absence of anatomic abnormality.

(5) The ante-operative diagnosis of sliding hernia, irrespective of what may be the sliding viscus, is a physical impossibility.

(6) The sliding portion of a sliding hernia cannot become strangulated, although strangulation of the true contents of the hernial sac is commonly observed.

(7) The treatment of hernia, including the sliding type, is essentially surgical; and unless the nature of the pathology be promptly recognized and extreme care exercised in executing the operative steps, irreparable damage may be inflicted upon the sliding viscus.

400 The Atherton.

Diseases Versus Disease

Notwithstanding the wails of the pessimists, mankind is steadily improving in bodily strength and vigor.

The average length of life is greater and the standard of bodily health higher than ever before; and, if it were not that medical and sanitary skill now preserves, for a life of imperfect health, many weak persons who in former times would have succumbed to the first attack of disease, the standard would be even higher than is actually the case.—*American Journal of Clinical Medicine.*

URACHITIS SUPPURATIVA.

Weller Van Hook, A.B., M.D.
Chicago, Illinois.

Urachitis has been described with sufficient frequency to enable the physician who bears his elementary embryology in mind to make a diagnosis at once in typical cases.

The writer saw a case of this kind in the year 1893 and reported it to the Chicago Gynecological Society in February, 1894. The essential points in that report may be quoted as follows:

"*Personal History.*—The child was in perfect health, exhibiting no morbid condition of any organ or any functional disturbance of any kind, until three weeks old, when it had abdominal pains followed by diarrhea and vomiting. Indigestion, doubtless caused by bad feeding, recurred frequently until about November first. The child then improved and digested its food much more perfectly. In spite of the poor hygienic circumstances by which the child was surrounded, and in spite of its poor alimentation, it grew fairly well and possessed a good amount of adipose tissue. In the latter part of November the child began to be ailing, took its food poorly, and cried when handled. The mother then noticed a protrusion of the abdominal wall below the umbilicus, the skin at first appearing of a normal color, afterward becoming a dusky red. The swelling kept increasing in size and the skin above and below the umbilicus kept getting more red, until, four weeks after the beginning of the malady, the swelling attained the size of a large orange. The mother then applied hot applications over the tumefaction for several days, with the result that an enormous amount of pus discharged spontaneously through the umbilicus. The mother strenuously denies that fluid of any kind had previously passed the umbilicus. She insists also, upon the closest questioning, that the amount of pus discharged was at least four ounces. The child improved to a certain extent, although pus continued to be discharged from the umbilicus, for two weeks, when cystitis began, as shown by very frequent micturition, great restlessness, and evident pain in the genitals when urine was voided. At the same time the parents noticed a swelling beginning to be formed in the right inguinal region."

"Examination made at this time, upon presentation of the child at the clinic, gave the following result: Child 6 months old; girl; of average development; presents no evidence of disease of the heart, lungs or digestive organs. The child urinates repeatedly during the examination, the urine passed being of a straw color and quite turbid. The umbilicus projects slightly upward and forward, apparently pushed in this direction by a tumefaction the size of a small apple, which also pushes forward the abdominal wall between the navel and the pubes. The centre of this globoid tumefaction seems to be about one inch behind the abdominal wall. The tumefaction is covered by skin of a very slightly reddened color, but the umbilicus has a red, inflamed appearance. A thin pus trickles slowly from a small opening in the lower portion of the umbilical fold when pressure is made upon the tumefaction. A small pocket probe can be passed downward and backward about one and a half inches. Palpation gives a sensation of bogginess in the region of this swelling. In addition to this enlargement in the median line there is also a swelling in the right inguinal region about one and a half inches in length. This swelling corresponds to a number of superficial inguinal glands which can be palpated through the skin. They have already become bound together by inflammation of the connective tissue between them."

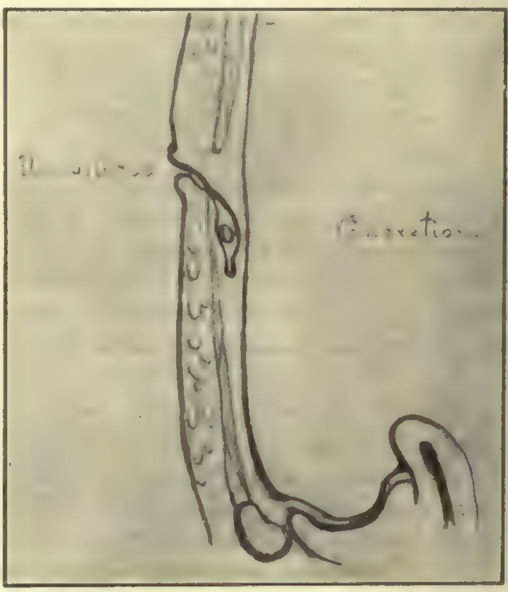

Fig. 1. Diagram of Abdominal Wall in Section Showing Concretion in the Old Urachal Tract.

"Treatment was at first confined to daily irrigations with peroxide of hydrogen solution, with drainage by means of a small piece of gauze introduced into the umbilical opening. After four days' trial of this method improvement was found to be so slow that it was decided to drain the abscess more thoroughly. The child was accordingly anaesthetized with chloroform on January 2d, 1894, and the opening dilated with an artery forceps.

Examination could now be made quite freely; the probe could easily be passed down almost to the pubes, and laterally to a distance of about one and a half inches. The bladder was not entered by the probe. A small drainage tube was introduced and fastened in place by a stitch. The suppurating inguinal glands were opened and scraped out, and the resulting cavity packed. Daily dressings caused the two cavities to close completely in about one week."*

The writer has recently observed an additional case, which was complicated by the presence of a foreign body.

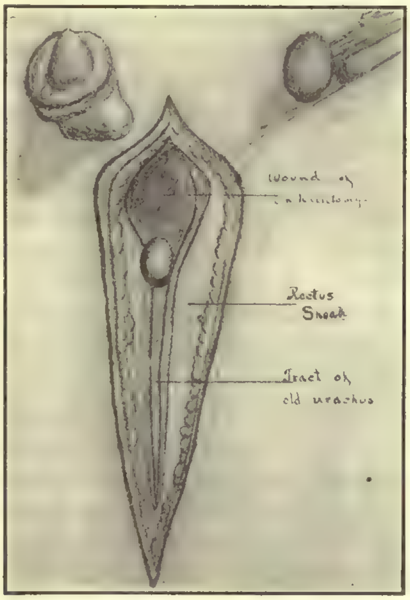

Fig. 2. The Excised Umbilicus, to the Left Above. The Concretion, Slightly Enlarged. The Larger Drawing Shows the Wound; Above Where Omphalectomy Was Done; Below the Opened Urachal Tract.

Miss S., aged sixteen years, without having received any injury, even so much as an abrasion, suddenly noticed one morning a discharge and tenderness at the lower part of the umbilicus. This inflammation increased and a mass formed involving the lower half of the umbilicus and the tissues of the abdominal wall behind the skin and subcutaneous fat. The skin moved freely over the aponeurotic structures but the abdominal wall projected slightly at the place mentioned, the tissues being involved for a distance of two inches downward toward the pubes and one inch laterally from the midline. Palpation revealed a firm mass associated with the abdominal wall.

At the umbilicus was an opening admitting a small silver probe just above a pea-sized mass of new formed granulation tissue. The probe passed into the abdomen and downward towards the bladder for a distance of three inches, evidently traversing an adventitious canal behind the linea alba. The probe seemed to lie in a free space but slightly larger than necessary to receive the instrument. No roughness or other evidences of the presence of a foreign body was noted.

The writer recognized the fact that he had to deal with a patent suppurating urachus and made an attempt to close it by dilating the opening for drainage and by repeated introduction of a probe bearing lunar caustic upon its point. But though a strong solution of silver nitrate was later introduced from a syringe through a fine probe-like canula into the cavity the cauterization had no other effect than to excite a well marked reaction.

Although the probe passed down toward the bladder, urine never escaped from the umbilical opening nor did pus contaminate the urine. So the urachal remains did not seem to communicate with that viscus or to involve it in any way.

Since healing did not occur it was necessary to proceed by an open method. Under ether anesthesia a median incision was made from the middle of the umbilicus downwards half way to the pubes and extending through the linea alba. When the recti muscles were thus separated from one another the probe, previously passed into the urachal tract, was laid bare beneath a layer of granulating connective-tissue and covered with pus. But a few moments were needed to scrape out granulations, to remove redundant scar tissue and to excise the umbilicus. The linea alba was closed with interrupted satures of chromicised catgut. Healing occurred rapidly without complication. The young woman has remained well.

My friend, Dr. Louis J. Mitchell, of Chicago, kindly supplies me with the following notes:

Miss M., aged 29. Moisture at umbilicus for several weeks, amount did not increase, never enough to term it "discharge," merely moistening of the skin. Otherwise no pain or discomfort. Directed to apply peroxide and after drying to dust on powdered boric acid. After a few days, on removing gauze a concretion was found in the dressing. This was about $\frac{3}{8}$ in. by $\frac{1}{8}$ in., chalky, white and possessed a fetid odor. After extrusion of the mass the discharge stopped promptly. (Nothing abnormal to be seen or felt before appearance of the concretion, no fistulous opening, no induration or tenderness.)

Cullen's* painstaking and praiseworthy study of such cases considers much additional material but does not add much that is new to our conclusions of the earlier day upon this particular phase of urachal disease. But the richness of material which the literature now provides and Dr. Cullen's laborious analysis of symptoms makes his work indispensible on the general topic.

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*American Journal of Obstetrics, Feb., 1895.

*The Umbilicus and its Diseases, 1916.

The diagnosis and treatment are in entire accord with our common knowledge of the anatomical, pathological and surgical principles involved.

31 N. State St., Chicago, Ill.

THE MOVING PICTURE AS A MEANS OF TEACHING MEDICINE AND SURGERY.*

W. O. Owen, Colonel (Retired), U. S. A.,
Washington, D. C.

There are few things which the profession of medicine understand so little of as the value of the moving picture in teaching medicine. Very few men realize that at the present moment there are at least four varieties of these moving pictures.

In order that this explanation may be understood, it must be borne in mind that the original projecting of the moving pictures occurs at the rate of 16 per second.

The first of the varieties and the only one which, so far as I am aware of, has been used in medicine, is the ordinary 16 to the second moving picture, taken without any accessories to mark either time or distance.

The second of these moving pictures is where the pictures have been taken at the rate of 32, 64 or 128 per second. These, when thrown upon the screen, appear to take two seconds, four seconds, eight seconds for the motion to reappear, which motion has taken, in the ordinary way, one second to transpire.

The third variety of these pictures consists of placing within the picture itself the elements of both time and distance.

The fourth variety of moving picture is the *animated diagram,* or drawings superimposed upon each other to the end that the motion apparently has been created.

The ordinary moving picture I do not care to discuss. Its value as a teaching force is comparatively minor, for the operator, unless very carefully trained, does not keep the field of operation clear from blood, and blood blots out the entire field; and unless the operator has carefully trained himself beforehand, he is very apt to forget and permit his own hands or his body, or that of some one of his assistants, to obscure the field of operative procedure. Then again, unless the photographer is carefully trained beforehand to operating room processes, he does not realize that he is to take the field of operation only, and that when he permits a hand or a body to intervene between his lens and the field of operation that he is getting a picture that is not wanted. The result of these combinations is that very few of these pictures are of real value from the standpoint of the teacher of medicine.

I recall one instance in which the operator was endeavoring to secure the middle meningeal artery, but a jet from it came into view and the field was immediately obliterated by blood and the operator's hands did the rest; the picture was valueless.

The rapid taking of a picture at 32, 64, etc., simply means that the picture is being taken at two, four, six or eight times the speed at which it is to be projected upon the screen, and then slowed down so that many of these motions may be analyzed and the muscles involved in the movement may be determined.

I believe this would be of very great value in the study of spasmodic seizures, and the various twitchings which disease brings forth in human beings and other animals, and will enable them to be analyzed; and the analysis itself then subjected to further scrutiny in individual photographs of the cases upon which the analysis had been originally made.

If you will take the third variety of moving picture, that in which the elements of time and distance have been placed, it will enable the medical profession to utilize that most valuable method so widely developed in the engineering world, known as the *simultaneous motion chart,* by which both the time and distance elements are charted into rectangular figures upon a chart and the relation of these in time is placed upon the chart.

It is my belief that if the cycle of movement of man and other animals, in the various spasmodic muscular movements, is charted as I have suggested, that these movements will show upon the simultaneous motion chart the regularities or irregularities of the cycle of movement. This will enable the medical man studying these charts to determine almost instantly whether there is involved mental action, either conscious or unconscious, or whether it is dependent upon some central disturbance or destruction. Particularly valuable would this be should some operator develop a special technic which he desires to teach other men, which he has hitherto been unable to do because of his inability to demonstrate clearly, so rapidly does the position of his hands and instruments change in the performance of this technic. The rapid motion picture would instantly throw this upon the screen and explain it in detail and he would then be able to teach any man his automatism, thus enabling him to perform it with equal celerity and precision, for the majority of these technical movements have been unconsciously developed, and the man himself does not truly know with precision just exactly what he has done.

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*Read before the Orthopaedic Section of the New York Academy of Medicine, January 18, 1919.

As for the fourth and last variety, this is perhaps the most important of all. In this the teacher creates the diagram of that which he wishes to express to his class and in words describes it in detail to an artist; the artist makes a series of drawings, carrying the one into the other in such manner as to avail oneself of the visability of the eye. When one sees motion, the movement of this motion in many cases is so rapid that one does not receive a conscious impression of the components of the movement. For instance, the spokes of a wheel rapidly turning produces a very rapid succession of impressions upon the retina, and one is given the impression of movement because one is conscious that it is movement. This is a fact so far as the majority of motions are concerned.

If you will make a picture of a nail and a hammer and lay them upon a picture to be photographed by the moving picture camera and take a picture of them, and then place the hammer on top of the nail in the position it would have assumed had it struck the nail, and take, let us say, two photographs of it in that position,—then cut the end off of the drawing of the nail, and move the hammer and the nail down so that the cut end of the nail shall rest where the point formerly did, and take a couple of pictures of that, when these six pictures are thrown upon the screen, you will see the hammer leave the position from which it started and hit the nail a blow and drive it into the wood.

Now, this principle is utilized by the teacher desiring to make animated diagrams; he makes the beginning of the motion, what the position will be half way between, and that which it will assume at the end, and then the artist puts in the necessary number of drawings to fill in the position and the motions which have transpired. If he desires that the motion shall be very smooth and very free from jerkiness he makes a large number of drawings and only takes two pictures of each one of the drawings; if he takes four pictures of the drawings, the drawings then appear upon the screen in one-fourth of a second, because these pictures are running through at the rate of 16 to the second, with the result of jerkiness. With two to the second it only means one-eighth of a second,—and where the impression upon the retina does not exceed one-eighth of a second, the jerkiness does not appear. When it gets to one-fourth second or more, the ordinary eye gets the distinct fixed position of the image, and when you substitute for that a new image one-fourth or one-half second further along, and the same image again appears, still further along, there is a distinct jump in it, because there is a distinct impression upon an entirely new part of the retina.

I have had part in the creation of quite a number of these diagrams, which have been made by quite expert medical men and very expert artists,—one, for instance, of femoral hernia, operated upon by the inguinal route: another showing the travel of the nerve influences from the semi-circular canal to the cerebrum and its effect in producing nystagmus; still another showing the methods of Dr. Albee in bone graft; the method of producing the rale in the diagnosis of tuberculosis, and of the auscultation and percussion of the chest.

It would also be very useful in such a process as showing the irregularities of the heart motions through injuries done to the bundle of His or to the pneumogastric nerves.

All of these are quite easily created and it appears to me that it ought to be a function of the National Government to create these films for the medical profession, to make them available to the profession for teaching purposes through some such agency as the Commissioner of Education or other branch of the Government devoted to educational purposes.

These matters were begun, and have been, up to the present moment conducted by the Office of the Surgeon-General of the United States Army, who has on file quite a number of these processes.

It might also be interesting to know that there has been developed in the Office of the Surgeon-General two instruments of very great value in this work.

One of these is a tandem printing machine in which the pictures are printed, let us say, the first picture twice, the second picture twice and so on, tandem, through the entire picture, also making a tandem of four, a tandem of six and a tandem of eight. These are very useful where jerkiness is not a matter of moment, but any picture may be slowed down one-half by means of this printing machine. No jerkiness appears in pictures which are taken at 16 to the second or are projected at 16 to the second, and the introduction of extra pictures, when it does not lengthen the time to a period exceeding one-eighth of a second, does not produce a jerkiness which is noticeable.

There has also been produced here an extra rapid camera with which pictures have been taken with a timing device in the field, showing that the pictures had been taken at the rate of 128 to the second. This, when coupled with the tandem machine, will enable you to throw upon the screen a picture in the ratio of 1 to 16 in relation to the time of taking, so that a picture which took one second of actual time to take will go down upon the screen at the rate of 16 seconds instead of one second, and thus the movement may be analyzed quite easily.

REMARKS ON METHODS OF TEACHING MEDICINE AND SURGERY BY THE CINEMATOGRAPH.*

MAJOR K. TUNSTALL TAYLOR, U. S. A.,
Office of the Surgeon-General,
WASHINGTON, D. C.

I am presenting abstracts from my work in the Office of the Surgeon-General, illustrating the recent methods of teaching orthopædic surgery to medical and line officers and enlisted men in the Army.

As a supervising surgeon, it early became apparent to me, in lecturing at various cantonments or to any large body of students, that simply the verbal lecture, with the limitations of the human voice and the absence of illustrations or clinical material, was inadequate for attention and retention by the memory; charts and slides were impractical, so that the moving picture, on my initative and the hearty cooperation of Colonel Owen, was established in the Surgeon-General's Office and the other specialties soon availed of it.

In creating these lectures, I have had in mind not only military instruction, but adding teaching facilities available for use in our civil medical schools, upon request to the Surgeon-General.

It soon became apparent to Colonel Brackett, Director of our Division, and the rest of us engaged in this instruction, that it was expedient to go into the most rudimentary facts regarding locomotion, the prevention of avoidable disability and the recognized treatment of the more common affections of the lower extremities. Some thousands of feet of film I prepared on these subjects alone.

After completing our task of instruction in preparation for over-sea duty, our attention was next directed to the demonstration of methods for the immediate care of the wounded.

Finally, our efforts have been to portray in detail the technic of surgical reconstruction in tendon, muscle, bone work, etc.

The moving picture film will bring the student into closer touch with clinical material, certain symptoms such as neuroses, epileptic seizures, tics, etc., than are ofttimes available in hospital routine instruction and difficult to describe, but the so-called "close-ups," as shown by "the movies," will bring the student intimately in contact with the operating table, which is often not possible from an amphitheatre seat. The details of arterial, nerve or intestinal anastomosis, bone grafting, application of mechanical principles of direction and technic in tendon and muscle transplantations for deformities and application of deep sutures are brought home and fixed in the memory as by no other means of instruction, save actual experience later in the procedures themselves.

This mode of instruction, in conjunction with the didactic lecture, has been found to yield a higher average mark per student than any other mode of teaching.

The moving picture possesses the advantage over the lantern slide in that the component parts of a lecture cannot be disarranged, broken or lost, nevertheless inserts or additions can be made, almost unlimited positives can be printed from the original negative at the same cost as slides, and films are lighter and more easily transported than slides. A simple modern attachment is also now available for stopping the moving picture machine at any point without burning the film, when it is desired to emphasize some special picture, thereby putting it in a less costly class than the slide, which has not heretofore obtained and was an objection.

By means of the moving picture in comparative teaching of the future, the medical student will also be able to see the modifications of several surgeons in performing a given procedure; thus a class may see the technic employed at the clinics of this and other countries at the same sitting and appreciate the value of the points made in each. It is thus very broadening in its educational possibilities. Or a clinical professor, who wishes to illustrate his systematic course of lectures, but is lacking in clinical material, can resort to a moving picture record of the desired cases, symptoms, signs, operation, etc.

The films of the Army Medical Museum will be available to teachers in the army and medical schools and the profession, just as the books in the

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*Read before the Orthopaedic Section of the New York Academy of Medicine, January 16, 1919.

Surgeon-General's Library are for study or reference, provided transportation, safe handling and return in good order or replacement are guaranteed.

It is hoped that the profession will cooperate in giving films to this department or allow it to make copies of existing negatives.

It has been brought to the attention of the Surgeon-General's Office that certain commercial film companies, having made medical films, wished to charge this department for copies or the profession for exhibition purpose on a commercial basis. Physicians could easily and should specify, when approached to demonstrate a new original procedure for a "movie" company, that a copy be sent to the Surgeon-General for the profession at large, before permitting it to be made.

Many facts in the prevention of acute foot strain, the so-called flat-foot, and the explanation of the large number of torn ligaments at the knee and ankle in trench jumping at the cantonments have been explained by this department and moving pictures prepared to demonstrate how to jump correctly and prevent such disabilities. Also as a result of this film, instruction in standard foot examinations, shoe fitting, correct balance and marching, to be used in the Army, have become or will shortly be issued by the General Staff as general orders, etc.

By diagrammatic or "stop-motion" line-drawing or "animated drawings" as they are called, a most valuable instructive preliminary is at hand to precede a picture of an actual operative procedure. Demonstration of details in brace construction, fitting and therapy, and especially in recording, charting, measuring departures from normal gait, this new national aid to orthopedic surgery is an added asset, divested of the costly obstacle which has prevented its addition as a routine in the teaching of standard methods by many heretofore.

My plan in teaching my students any given operative procedure is to show them the "animated drawing" first, then a "close-up" of an actual operation and other surgeons' technic in that condition, and finally the operation itself, on the living subject, with illustrative cases before and after the operation.

Gain may be temporary and uncertain; but expense is constant and certain.—Buy War Savings Stamps.

THE TREATMENT OF BURNS IN NAVAL WARFARE.

C. P. G. Wakeley, M.D.,
Temporary Surgeon, R. N.,
H. M. Hospital Ship "Garth Castle."

Burns and scalds are of frequent occurrence in the Navy, even in times of peace, and the percentage has increased enormously during war conditions.

Burns are often of great magnitude, being the result of accidents such as boiler or cordite explosions. Some suffer from burns pure and simple, others from serious accompanying wounds, and when, in the case of cordite, the explosion occurs in a turret or other confined space, great pressure is developed as well as intense heat, which forces the gaseous products of combustion into the tissues and is responsible for some of the effects produced.

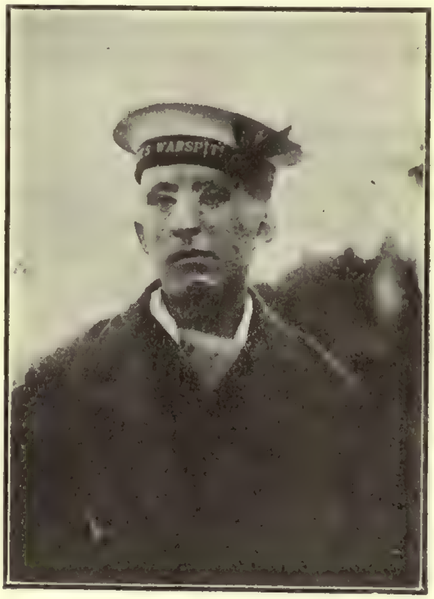

Fig. 1.

In the Dogger Bank Action and the Battle of Jutland[1], [2] I had to treat about 150 cases of burns at R. N. Hospital, South Queensferry, and these burns were plentiful and extensive. Since these were mostly due to sudden flashes of cordite, it was rare to find a burn of more than a third degree, and equally rare to find them affecting parts of the body other than the face and hands. Burns due to shell explosions and scalds due to boiler explosions are generally of a graver nature than those due to flashes of burning cordite.

The treatment of burns should be expectant as well as immediate. At the Battle of Jutland the majority of cases when they arrived at the hospital had been treated with the Service picric acid dressing, but patients from H. M. S. "Tiger" who were under the supervision of Fleet Surgeon Muir[3] and had been treated with an oil antiseptic dressing, and these, in my opinion, did much better than those treated by picric acid.

Picric acid without a doubt is most practical and efficient first aid dressing in some respects, but should only be used as a first aid dressing and nothing more. An oily antiseptic dressing which I have been in the habit of using for some years consists of: Menthol, 3 grains; eucalyptus oil, 3 minims, and carron oil to the ounce; this preparation is spread on white lint. Such a preparation has several advantages over a picric acid dressing; it does not adhere to the skin, its application and removal are painless. This cannot be said of a picric acid dressing; for, although it has been applied wet, it soon becomes dry, especially in a ship and during and after action, when the cases are treated in confined spaces, and where the air is hot and dry.

Also such an oily dressing is non-toxic, antiseptic, soothing and acts as a deodorant.

For superficial first degree burns Rosalan Solution,* which was introduced by Surgeon-General Sir G. L. Cheatle, K.C.B., F.R.C.S., or Malachite Green Solution are excellent preparations and the skin grows well under the scab formed.

Heavy liquid petrolatum has been used with good results by Barker[4]. It can be sprayed on the burn by an ordinary oil atomizer or applied on a swab, and is entirely painless. It was found that agar cultures of streptocococcus albus, streptococcus aureus and B. subtilis covered with mineral oil were checked in growth. This treatment with liquid petrolatum is very useful in first and second degree burns, but is not so good for burns of the third degree.

Much has been written regarding paraffin preparations in the treatment of burns, and of these preparations No. 7 paraffin as used by Lieut.-Col. A. J. Hull, R.A.M.C.,[5] and Ambrine are, in my opinion, very useful for the treatment of burns in hospitals and hospital ships; but I consider that Ambrine is not the best first aid dressing for a battleship in action. Its application takes too long where many men have to be treated. Surgeons in a dressing station on a battleship may at any time have to work by the aid of candles and heating Ambrine by candle flame would take a long time. An Ambrine outfit is supplied to all ships of the Navy and is very compact and full instructions are given as to use (see also *Lancet*, February 3, 1917), but its usefulness, in my opinion, is limited to isolated cases of burns which often occur in the every-day life on board. Such cases can be treated with Ambrine and often do very well.

It is claimed by some people that skin-grafting is no longer necessary in the after treatment of burns treated by Ambrine. With this I cannot agree and I have had to resort to skin-grafting many times after Ambrine treatment.[6] Medical men in France state that deep burns treated with Ambrine heal without any scar tissue, but I have always found that scar tissue forms in the ordinary way, as seen in Figure 1.

The great ambition of the Naval Surgeon should be the prevention of deformities following the 3rd degree burn and I quite agree with Parker,[7] who made the statement that "however extensive they may be, as long as they are compatible with life, healing may and should be obtained without deformity and with good function;" this does not apply to the face.

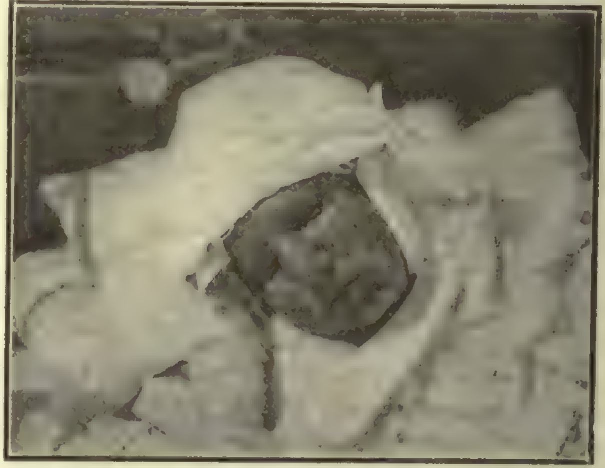
Fig. 2. Burn Due to Shell Explosion During Treatment, H. M. S. Warspite.

War burns are septic burns, and heliotherapy in my mind plays a very valuable and important part in the treatment of them. Heliotherapy has been greatly used in France during the war in the treatment of septic wounds. Cases of burns received at R. N. Hospital, South Queensferry, after the Jutland battle were treated with the oily emulsion I have mentioned above. The emulsion was applied to the face and hands and no dressings were used. The patients were kept out of doors in the sunshine as much as possible. The men enjoyed the treatment and it was found that the burns quickly crusted over, an exudate formed beneath the crust, which was raised and took on the appearance of rupia (see Figs. 2 and 3). The crust fell off in time, leaving a reddened, healthy surface without scar. I never use face masks in the treatment of burns of the face, the patients dislike them intensely; and it is impossible to treat any purulent conjunctivitis, which is often present and requires frequent irrigation. I do not advise dressings for the limbs as advocated by some[8] as I consider that the exudation becomes pent up and increases the toxemia of the patient. Fomentations are used by[8] some surgeons directly a burn becomes septic and since I consider that all war burns are septic burns it would constitute the only treatment. I strongly condemn this form of treatment, because fomentations cause burns to become deeper and a 3rd degree burn can be produced from one of the 2nd degree, this[1] I have proved both clinically and experimentally. I have found that the application and removal of fomentations are very painful.

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*Rosalan, 1 part hydraryperchlor, 2 parts; spt. vini dect, 1000 parts.

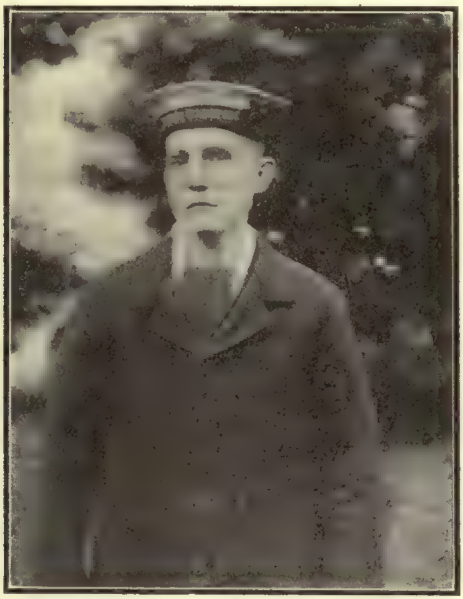

Fig. 3. The Final Result of Treatment of Fig. 2. No Scarring or Deformity.

In the old literature one finds recorded cases of pneumonia, gastric and duodenal ulceration, intestinal hemorrhage, suppression of urine and tetanus following severe burns. In none of the fatal cases I treated was any such complication found at the post mortem examination; the fatal cases died of shock. I did not have a single case of nephritis in the burn cases received after the action on May 31st, 1916, and I am of the firm opinion that cases of nephritis are much less frequent when treated without dressings than with them.

Burns of the 4th degree, especially if extensive, require skin grafting; but before this is undertaken it is essential that the wound is made up of healthy sterile granulations. This can be verified by bacteriological examination of a film, because a distinction must be made between clinically sterile and bacteriologically sterile lesions. Thiersch's method is mostly used, but Reverdin's and Wolf's methods both have their place in the treatment of burns of the face and hands.

In conclusion, I consider that as a first aid dressing in action an oily preparation on lint should be used. In quiet times and in civil life "Ambrine" or some form of paraffin preparation can be used. In the after treatment of burns heliotheraphy plays a very important, if not the most important, part.

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LEADING UP TO MODERN OPERATIVE BONE SURGERY.*

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Until a very few years ago members of the medical profession were quite well satisfied with the results they obtained from treating fractures, whether simple or complicated, by methods which, up to ten or twelve years ago, were considered right, or at least as good as the practice of those days could secure.

In former days except in cases of non-union and in fractures of the patella and olecranon, it was a rare thing for a surgeon to operate upon a fracture, and in the cases mentioned the results were often far from satisfactory. Surgeons who were noted for their original work were on the lookout for some better and more satisfactory method of treating bone lesions. Silver wire, although the best agent we possessed for many years, for fixing the fragments and maintaining approximation, yielded its place to kangaroo tendon, which has stood the test of time. The late Dr. John B. Murphy, however, had for several years been using phosphor-bronze wire for this purpose.

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*Read at the Quarterly Meeting of the Broome County Medical Society, held at Binghamton, N. Y., Jan. 7, 1919.

Frank Hamilton and D. Hayes Agnew, both of whom were called to treat President Garfield in his last illness, were considered the leading bone surgeons of their day. Dr. Bigelow of Boston, Dr. Nathan Smith of New Haven, Dr. E. M. Moore of Rochester, N. Y., Dr. Swinburne of Albany, and Dr. N. Y. Leet of Scranton enjoyed almost phenomenal success in the treatment of fractures by the old method.

To Dr. Lewis S. Pilcher, of Brooklyn, N. Y. City, my esteemed colleague and co-worker, belongs the honor and credit of teaching the profession the true pathology of Colles' fracture and a correct and easy way of reducing the fracture without causing further damage and inflicting unnecessary trauma, and all this without the open operation.

The late Dr. Nicholas Senn, after much original and experimental work, brought out his decalcified bone chips. This agent was used for a time, but is no longer in use.

The late Dr. A. M. Phelps of New York endeavored to graft a portion of bone, supported by the nutrient artery, from the arm of a dog, into the bone of a boy's leg, but met with failure. Dr. Phelps' efforts in this case were honest and most praiseworthy, but at that time the clouds had not cleared, and he met with criticism from both the profession and the daily press.

The works on Fractures and Dislocations by Frank Hamilton, W. L. Estes, Stimpson, Roberts and others are excellent and served their purpose well in former times. But the times, customs, and practice are continually changing.

The accidental discovery of the *x*-ray, its application in the diagnosis of fractures and its aid in suggesting to the surgeon the correct line of procedure in all bone lesions, marks the most important era to date, in bone surgery the world over.

Surgeons were quick to see the advantages of the *x*-ray in many branches of surgical practice outside of bone work. Today the *x*-ray department of every well-equipped hospital is busy with important work.

Formerly in making a study of the progress of fractures by the aid of the *x*-ray the surgeon's first and chief interest was in apposition and alignment. Of late, close observers, however, have been interested in going a step further, and in watching the wonderful changes at different stages of bone formation, the work of the osteoblast in building up, and of the osteoblast in tearing down, and clearing away material no longer of use, and finally, the end results of Nature's perfectly wonderful work—new bone formation.

END RESULTS.

The use of the *x*-ray has enabled observing surgeons to see that end results of the old-time closed method of treating fractures are not always as good as they might desire. Results were often bad. They found overlapping and consequent shortening of the limb present more often than they had expected. Bad alignment, angulation and weak, awkward limbs, sometimes of little use, not infrequently resulted.

There may be a deficiency in the lime salts of the bone, the blood stream may carry a specific germ. or shreds of muscle and fascia may be caught between the ends of fragments; the broken bone fails to unite and non-union occurs.

Nature has done her best to repair the injury, but she has been hampered in her efforts. Conditions have not been favorable for her delicate work. She is not willing to allow the case to be recorded as a failure. n her silent way she appeals and signals to the surgeon for aid and assistance, which is really *all he can ever do*. But when he responds to her call, we have a right to expect that he will come well equipped for his work, with the most complete and modern set of instruments to be found.

If the surgeon does this and does his work well—what may we expect and what may we see? Barring infection, we should see Nature cause the sick to be healed, the broken bone to unite and the lame to walk. To the maimed and crippled child who has never been able to walk and play in the sunshine this means much.

When surgeons, guided and directed by their *x*-ray findings, began operating to correct bad end results, with such instruments as they had at hand, their work was tedious and results were often far from satisfactory. Then came the need and call for a more complete and modern set of bone instruments.

SPECIAL INSTRUMENTS—SPECIAL TECHNIC.

Geiger, Albee, and Frank Hartley have each devised and worked out a complete set of motor-driven instruments for bone work. The wonderful works that are being done today in bone surgery could not be done without slow-running motor-driven instruments.

Bone and joint work is delicate and very difficult to perform, but the more familiar one becomes with osteogenesis and end results the more fascinating becomes the practice of operative bone work.

There is no branch of surgery so particular and difficult to perform as bone and joint work. To go through the soft parts and operate on the bony framework of the body, to open into and operate upon a joint, and get out without infection, and secure the results desired, requires the most thorough aseptic precautions and careful attention to details on the part of the surgeon, assistants, and nurses. But the relief given and the results obtained from operative treatment are so wonderful and so satisfactory that one feels well repaid for every effort put forth.

Geiger says: "It cannot be too often mentioned that bone surgery does require a special technic. Vigorous aseptic precautions in preparation of the operative field, the surgeon, and his assistants are absolutely essential."

OPEN METHODS.

Estes, Geiger, Albee, Crile, Frank Hartley, Chittenden, Wainwright, Guthrie, Marcy, the Sharpe brothers, the Mayo brothers and many others have been supporters of the open operative treatment.

For a number of years the late Dr. John B. Murphy's wonderful bone and joint surgery had attracted attention and admiration all over this planet. The bone and joint work of this shining star of surgery will ever stand out as a prominent part of the magnificent monument which John B. Murphy unconsciously erected to his own memory. He made a close study of Nature and her signals and tried to supply what she lacked and was calling for to finish her work. In doing this, he has left a record of his findings and experience to illumine our pathway so that "he who runs may read."

Great credit is due Lane of London for his pioneer work in establishing the open method of treating fractures and for the perfect operative technic which he has developed, but I do not believe that the metal plate is to be compared in any way with the autogenous bone graft in the operative treatment of vicious fractures.

EDUCATION.

It was not so very long ago that some members of the medical profession and the public held that the knife was only to be used as a last resort in the treatment of cancer. Today we all know that every vestige of cancer should be removed at the earliest possible moment.

It required a campaign of education to inform the public that tuberculosis is a communicable but preventable disease, that the open air life with sunshine, good food, and proper hygienic care are the essentials in the treatment of that disease.

When we first began operating for the relief of appendicitis the medical profession was divided into two classes—the conservatives and radicals—on the question: "Shall we operate or shall we wait?" Today the public knows very well that as soon as the family physician is sure of his diagnosis, the sooner the patient is placed in a hospital and the operation is performed, the better are the chances for recovery. There is no discussion of the question today. It is settled for all time. The answer is: *operate, and do it now.*

FRACTURES.

Today there is a difference of opinion in the medical profession on the question of the treatment of broken bones, and of course the public as yet is not fully informed. The question is: Shall a broken long bone, and certain others, be treated by the non-operative method or by the modern open method? Is an operation necessary?

Some medical men say we shall try the old or closed method first and if it is not satisfactory we can try the open operative method later on. If the closed non-operative method is not a success, it means loss of time—in some cases months—and later on, if an operation is decided upon, this means a much more tedious and difficult operation for both surgeon and patient. Delay may not jeopardize the life of the patient, unless the bone becomes infected, but if an operation is necessary and the patient is not given the benefit of it, someone is certainly taking chances on at least a possible disability, and possibly the patient may become crippled for life. In such cases who is responsible? The family physician and the bone surgeon whom he calls in consultation are responsible.

If this matter is fully explained to a patient he is not at all likely to take any chances on going through life carrying a crooked and disabled arm, wrist or hand or a thigh bone with one inch or more of shortening, if such a disability and deformity can possibly be prevented—and, in most cases, it can be prevented.

TIME.

The time to settle the question of operative or non-operative treatment of a broken bone is as soon as possible after the accident causing the fracture has taken place. How can the question be settled? By the aid of the x-ray and a consultation with an expert bone surgeon.

It is clearly the duty of the medical profession at all times to do all in its power to instruct and inform the public on matters of public health, prevention, safety, and the spread of disease. In the matter of advising the public in regard to the treatment of broken bones the medical profession, and especially the family physician, supported by an expert bone surgeon, can do a world of good in the way of preventing disability and disastrous end results, which includes earning powers and economic conditions as well, and these points will be observed and noted by the public.

When the family physician has been called to a patient with a broken bone or a dislocation and has made his patient comfortable with a temporary dressing, he should not rest until he has brought to his aid the *x*-ray and counsel of a bone surgeon. It is no reflection upon the ability of the family physician to do this. It is the right and proper thing for him to do. In doing so, he is looking after and guarding the very best interests of his patient and in turn is protecting himself, for such a course divides responsibility. We should never forget that the most important part of these cases is the patient.

HOSPITAL TREATMENT.

As time goes on and we gain more from experience, we find that more fracture cases are being operated. This does not mean, however, that all cases should be operated, neither does it mean that operative treatment should be left as a last resort, in cases where operation is clearly indicated. If a case is one requiring operation—in justice to all—this fact should be determined with as little delay as possible

Fractures of all long bones are best treated in hospitals, where the attending surgeon or his assistant can daily make careful observation and notes as to the condition of the circulation and nerve supply, pain, swelling and color of the injured limb, especially of the hand and fingers, in fractures of the arm. This cannot be done with the patient off in the country.

It is not safe to allow fracture cases of the humerus or of one or both bones of the forearm, after a dressing has been applied to go to their homes off in the country and remain there for from two to five days without being examined by the attending surgeon. In that time, under certain conditions, irreparable damage to the arm may take place.

No surgeon can do full justice to himself, or to his patient, who does not examine these cases daily during the first two weeks of treatment, and some cases should be seen twice daily.

I believe that the day is not far distant when the family physician will fully realize that in cases of long bone fractures the best results are to be obtained from hospital treatment, and that he will be unwilling to take the responsibility of treating these cases in their homes.

TRANSPORTATION.

This brings us to the matter of transportation—the motor ambulance has settled the question of transportation. It has reduced the time, distance and pain of transportation to a minimum. We no longer hesitate to transport our fracture cases, but a very comfortable temporary dressing, that will fix the fragments, *without a preliminary circular bandage* with an abundance of cotton, should be applied. If it is a compound fracture, apply a 50% solution of iodine, a pad of sterile gauze and over that strips of adhesive plaster, but do not encircle the limb with adhesive.

Today, even in very remote districts, the farmer has his car, and in case of an accident to his family or neighbor, he will quickly improvise an ambulance, and the case is soon on its way to the hospital. When our boys and nurses have returned from the front, they will give valuable aid in transporting our injured to hospitals.

A CHANGE.

During the last ten years we have been passing through a test period for bone work, and have now reached a point where a decided change from non-operative to operative treatment of many broken and diseased bones is to be made. Included in this change, I am satisfied that we shall very soon see fractures of all long bones, whether operative or non-operative, treated in our hospitals. There, I believe, is where they should be treated, for there is where we can give our patients best end results, with stronger, more perfect and more useful limbs.

Within a very short time the advantages of operative bone and joint work will be observed in more satisfactory end results and the reflection of this improvement will create a demand from both the profession and the public, for operative treatment, when it is indicated.

This decided change and advance step in treatment will create centers for bone surgery work, surrounded by large fields, and as a result of this, I foresee special wards or special hospitals for bone work. Long trips with the motor ambulance and by Pullman will quickly transport, without pain, all fracture cases to bone hospital centers.

When all fracture cases are treated in hospitals, the responsibility and anxiety attending the treatment of these cases in their homes with no facilities, will be transferred from the family physician and the family, to the operating bone surgeon and the well-equipped hospital.

Dr. W. L. Estes of South Bethlehem, Pa., than whom we have no higher or more reliable authority, says: "The Committee on Fractures of the American Surgical Association collected 1,745 cases of fractures, the end results of which were ascertained and the patients examined. Of these 1,358 cases were non-operative and 387 were operative cases; 258 cases of simple fracture were operated, and 129 cases of compound fracture were operated. A little over 25 per cent. of the cases were operated.

"I find that of 97 major fractures of long bones treated in St. Luke's Hospital last year, we operated on 35, about 37 per cent.

"The open method when adopted should be employed early. It may be used at any age period except in senile cases whenever a skiagram shows a deformity or a position of the fragments which obviously cannot be reduced or when proper efforts at reduction and retention have proved unavailing.

"The sooner the adjustment or setting is done after the injury, the better and quicker the recovery.

"Reparative processes begin early, much earlier than surgeons have hitherto seemed to think. If setting the fracture is delayed, what already has been done by natural processes, will be destroyed and the second attempt to do the osteocementation will not be as quick nor as energetic.

"Open operations for simple fractures should be undertaken only by experienced surgeons who are thoroughly equipped by training and who have proper instruments and apparatus to meet all the possible indications of the operation."

COMPENSATION.

In cases of appendicitis and in fracture cases, the family physician who gives of his time, diagnostic skill and ability, before a case is sent to the hospital, should be paid a fee commensurate with the valuable service performed and the responsibility assumed in these important cases. The family physician should not allow his patient in fracture cases to depart with the idea that the service which he has rendered is trivial and but ordinary in character, although not more than from one to three visits or dressings may have been made. If he does allow this, the fault is his, and he can blame no one but himself.

Having made his diagnosis, properly applied a comfortable temporary dressing, and assisted in starting the patient on his way to the hospital, or if time permits, going to the hospital with him, the family physician has rendered a valuable service and is entitled to reasonable compensation. When the proper time arrives, the doctor is entitled to receive his fee, duly earned by his services, which were of importance and advantage to the injured as a preliminary to succeeding specialized service.

In writing and presenting this paper my object has been twofold: 1. To bring this question in proper form to the attention of the medical profession and to point out, or indicate, what I consider the attitude of the profession should be in regard to the management and treatment of broken bones. 2. To inform the public of the wonderful advances and changes which are being made in bone surgery and of the many benefits along this line, to which the public is justly entitled.

In doing this I feel that I have done my duty up to this point, in the way of trying to prevent disability and disastrous end results in these unfortunate fracture cases.

Salvage of Manpower.

The principle of salvage extended to the vital assets of the nation would redound to our social, economic, and financial advantage in no uncertain way. Of the 2,500,000 men examined for the National Army in 1917, 33 per cent. were rejected because of physical unfitness. It has been estimated that about 3 per cent. of our population is constantly disabled by illness, though various sickness surveys suggest that this percentage is more nearly 2 per cent. Every man, woman, and child on the average loses about nine days per year as the result of illness. The annual wage loss as a result of illness to the workers of the country may be conservatively estimated at from $500,000,000 to $750,000,000. This large sum does not represent the loss to industry as a result of the interference with the normal working of the vast industrial machinery during the period represented by the illness of the workers.—*American Medicine.*

Surgical Skill.

While every practitioner expects to render the best service of which he is capable, it has often been demonstrated that complications will arise even in the simplest cases. There is no punishment for carelessness if all ends well; but if the results are less than expected there is likelihood of an action for damages, even where the utmost caution has been exercised. While contributory negligence is frequently a help in time of trouble, it is not safe to rely upon it, for when such an issue is raised the patient usually has the advantage in the matter of furnishing evidence. A surgeon may well approach such a case, therefore, with the assumption that he shall have to defend his diagnosis and treatment at every step of the way. He should exercise such skill as will bear the scrutiny of a court of law.—*C. L. Young in the Journal-Lancet.*

ESOPHAGEAL DIVERTICULUM.

(With Report of a Case.)

George A. Hendon, M.D., F.A.C.S.
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Current surgical text-books contain exceedingly meager information concerning esophageal diverticula. For example Keen and White dismiss the subject with one short paragraph: Diverticula from the pharynx and esophagus which are congenital also indicate incomplete closure of the branchial clefts, and occur in the same regions as the fistulæ; occasionally they are not congenital, but acquired. In several instances they have been successfully excised and the margins united by Lembert sutures.

Johnson is equally brief: A diverticulum may be found at the upper portion of the esophagus, and demonstrated by its filling with bismuth mixture which has been swallowed. Diverticula may also be found at the lower end of the esophagus, but the condition here is more apt to be a dilatation secondary to spasm, as the esophagus passes through the diaphragm,—the so-called cardiospasm.

MacCallum merely states that more localized dilatations are the traction and pulsion diverticula. The traction diverticula are common, and usually small and funnel-shaped; they arise from the persistence of connections between the esophagus and trachea, or from the adhesion and contraction of adjacent inflamed lymph glands. The pulsion diverticula are the outcome of local weakening of the esophageal wall and the forcing outward of a hernialike sac. These may become quite large, and are annoying in that they receive the food until they are full, and may, by their bulk, offer obstruction to the main channel.

Warthin accords the subject space more commensurate with its recognized importance, and his views in abstract are: Esophageal diverticula are of two forms, viz., (a) pressure diverticula, and (b) traction diverticula. The former are rare and arise from pressure within the lumen; the latter are more common and due to external traction pulling the wall outward. Pressure diverticula occur most frequently at the junction of the pharynx and esophagus on the posterior wall and extend downward between the esophagus and the vertebrae; the muscular wall is weakest normally at the point where these diverticula occur. Local bulging is caused by trauma from swallowing large and firm pieces of food, etc.; the bulging is increased by pressure of the food, and gradually there is formed a saccular pouch, the mucosa and submucosa bulging between the muscle bundles of the inferior constrictor of the pharynx. In some instances muscle fibers have been found in the sac wall and the condition has been regarded as an ectasia due to disturbance in closure of the fetal cleft. When the diverticulum becomes filled with food there may be noted dysphagia, "gagging," and vomiting. Decomposition of the sac contents may occur, followed by maceration of the lining epithelium, secondary infection, ulceration, and phlegmonous esophagitis or periesophagitis. Traction diverticula are more commonly observed. They occur usually in the anterior wall near the bifurcation and result from an extension of inflammation from neighboring lymph glands with adhesion to the esophageal wall and subsequent cicatricial contraction pulling the wall outward. The lumen of the diverticulum may point downward, horizontally, or upward; it communicates with the esophageal lumen by a round, oval, or longitudinal opening of varying size. Several diverticula may exist coincidently. In the majority of instances the lymph glands attached are tuberculous. Traction diverticula may exist without symptoms. However, through perforation of the sac chronic purulent periesophagitis may be induced with extension to pleura, pericardium, lungs, etc., and a fatal termination ensue.

Case Report: H. Z., a male, aged twenty-eight years, occupation barber, was referred to me by Dr. Eggers because of a tumor in the right submaxillary region of eleven months duration which had developed gradually without pain. Provisional clinical diagnosis: adenitis. Operative discovery, esophageal diverticulum: First operation May 6th, 1918: second operation July 28th, 1918 (local anesthesia): Ultimate result, August 23rd, 1918, completely healed. The following account of this case may prove interesting.

The patient had never been seriously ill. Eleven months ago he first noticed an enlargement beneath the right inferior maxilla. The growth was painless and gave him no serious inconvenience. There was no dysphagia nor difficulty in the mastication of food, but the gradual increase in size of the tumor caused the patient considerable uneasiness. He applied to a physician who lanced the growth, but he does not know the character of the material which was discharged.

When the patient consulted me the tumor had attained the size of a large walnut, and I at first thought it was an enlarged submaxillary gland. Operation was advised and performed on May 6th, 1918, under a general anesthetic. When the tumor was exposed it seemed to become larger the nearer its origin was approached. The general direction was downward toward the sternoclavicular articulation, outward under the clavicle, upward and backward beneath the floor of the mouth, but without causing any bulging within the buccal cavity.

It was now recognized that we were dealing with a totally different pathology than we had at first suspected. During manipulations incident to exposure of the tumor the sac ruptured and eight ounces of semi-solid and liquid food was expelled into the operative field. Of course the true nature of the growth then became plainly apparent, i. e., that it was an esophageal diverticulum. The diverticular sac was united to the platysma muscle, the excess of the sac wall amputated, and the incision then closed with ample provision for drainage. The course of convalescence was uneventful, the patient being discharged from the hospital ten days after operation. Through the sinus deliberately formed by the operation small quantities of food particles continued to be discharged; but the patient was able to change the dressings as required and to keep the parts clean. The sinus closed several times which fostered the hope that spontaneous occlusion might ensue.

On July 28th, 1918, under local anesthesia, the wound was reopened and the sinus walls with the adjacent cicatricial tissue carefully dissected downward to the esophagus and removed. The "stem" was ligated with catgut and the stump inverted, the overlying tissues being then replaced and sutured over the point of inversion. A satisfactory recovery followed this second operation, and by August 23rd, 1918, complete healing had occurred.

The foregoing case is considered of sufficient importance to warrant detail record. It serves to illustrate the fact that esophageal diverticula may occur with such frequency as to merit earlier and more general recognition. It also shows that such diverticula may exist for a considerable time without interference with mastication, deglutition or digestion, and also without the regurgitation of food. This patient had never exhibited any of the inconveniences which are usually considered constant accompaniments of esophageal lesions.

Another reason for recording the details is to direct attention to the desirability of executing the operative steps in two stages, and to further emphasize the facility with which such lesions may be treated by the two-stage operation. It seems certain that ante-operative recognition of esophageal diverticula would become more general were it not for the prevailing idea that their rarity entitles them to be classified merely as surgical curiosities; and that adequate surgical treatment would be more promptly undertaken if the facilities furnished by the two-stage operation and the reasonable assurance of a satisfactory outcome were more generally understood.

According to the views of Judd, esophageal diverticula are in reality only herniæ involving the mucosa and submucosa which project through the muscular coats. In traction diverticula distortion occurs from a "pulling" force outside the esophagus where it crosses the left bronchus. "Traction diverticula usually produce no symtoms and are of no surgical importance." (Judd). The author says, however, that Tetens found of eighty traction diverticula, six had assumed the characteristics of the traction-pulsion variety from food accumulation and pressure from within, which would indicate that this type may eventually become important from the standpoint of surgical treatment.

Probably less than two hundred cases of pressure diverticula have been recorded in the literature of the world. Stetten, in 1910, collected sixty operated cases with a mortality of 16.6 per cent. Judd's series includes thirty-five cases with two deaths. "Before the use of the modern methods of examination many of these cases were diagnosed as cardiospasm, esophageal stricture, and carcinoma. In many instances gastrostomy has been performed for esophageal diverticulum on the assumption that the obstruction was caused by malignancy." (Judd).

Pressure or pulsion diverticula practically always occurs in one situation, viz., "the cervical region in the unsupported esophageal wall at a point directly opposite the cricoid cartilage." It is claimed (Judd) that in this location there is a weak point in the musculature, i. e., at the esophago-pharyngeal juncture, sometimes described as the "pharyngeal dimple;" but just what is the determining etiologic factor in the production of pressure diverticula has not yet been definitely demonstrated. It has been shown, however, that esophageal pressure is greatly augmented during deglutition, and it seems likely the pressure is further increased by the swallowing of large masses of imperfectly masticated food. Hirsch observes that deglutition is bucco-pharyngeal and esophageal, that food is forced downward through the esophageal lumen by peristaltic action, that the upper orifice must be closed to permit the esophageal contents to enter the ventriculus, otherwise regurgitation occurs. While it is presumed these physiologic phenomena noted by Hirsch have been verified by other observers, I am unable to locate the confirmatory data.

The clinical symptoms ordinarily induced by the presence of an esophageal diverticulum were entirely absent in the case just reported, and the diagnosis was consequently not perfected until the tumor was surgically exposed. The physician to whom the patient first applied for advice was evidently also unaware of the nature of the pathology, otherwise he would not likely have lanced the tumor. The first manifestations usually noted are: dryness of the fauces with a sensation similar to that induced by the presence of a foreign body in the throat. The patient complains of dysphagia, and nausea with regurgitation of undigested food particles finally supervenes. When the diverticular sac attains sufficient proportions a palpable fluctuating tumor is noted beneath the angle of the jaw. The left side is more frequently involved than the right, but no reason can be assigned for the disproportion. For obvious reasons the clinical diagnosis may present some difficulty, but accuracy can usually be assured by careful anamnestic and clinical investigation. Confirmatory evidence is afforded by roentgenographic and esophagoscopic procedures.

The treatment of esophageal diverticula is essentially surgical and if the diagnosis has been correctly made, gastrostomy as a preliminary measure should not be performed unless the patient is in imminent danger of starvation and rectal alimentation is found impossible or is deemed inadequate. The inevitable desideratum is obliteration of the diverticular sac, and various methods have been devised by which this may be successfully accomplished. The most satisfactory procedure is believed to be excision of redundant portions of the sac with closure of the remaining opening by suture and inversion according to the plan pursued in the case reported. I cannot too strongly emphasize the importance of executing the operative steps in two stages as already described. The two-stage operation is also recommended by Mayo where the diverticulum has attained considerable proportions, and Murphy advocated this method of procedure in all cases. Mayo first dissects the sac free, leaving the neck attached; the sac is not opened during the first stage, but left outside the neck in the dressing; the skin edges are sutured to the esophagus at its juncture with the diverticulum. After ten or twelve days adhesions have formed about the sac, when it may be excised without an anesthetic and the edges inverted into the esophagus. "This operation is not difficult and is perfectly safe from any possibility of infection and has been very satisfactory in our cases in which the sac was fairly large. The infolding operation in the case of small diverticula and the two-stage operation for large diverticula seem to be very satisfactory and safe methods of procedure in all cases of diverticula of the esophagus." (Judd).

Perkins states that gastro-intestinal roentgenology has exposed pathology formerly considered rare but now known to be of comparatively frequent occurrence. Esophageal diverticula, non-ulcerative gastric diverticula or hernia, and sigmoidal diverticulitis, are among such lesions. The author has seen a gastric diverticulum holding a pint diagnosed by the roentgen-ray. He reports the case of a female aged forty-five, with cough and bronchitis, good appetite, but having gastric distress. Ten years ago following pneumonia she first noticed regurgitation of medicine and food sometimes ten hours after ingestion. She was treated for "nervous dyspepsia and cardiac spasm." Fluoroscopic and radioscopic examination in the vertical position showed retention of four or five ounces of barium mixture. Only on changing to the recumbent posture did it overflow and proceed through the esophageal lumen to the stomach. The diverticulum was situated at the level of the sternoclavicular articulation.

Mosher recently devised a new method of treatment, viz., dividing the common wall between the diverticulum and the esophagus. The primary step is to locate the opening of the pouch and also that of the esophagus, which is best accomplished under ether with a "ballooning" esophagoscope. Then with scissors the wall is divided to within one-eighth of an inch of the bottom, this small rim being left to avoid opening the mediastinum. There is but slight bleeding, the field being kept clear by suction The patient is nourished by rectum for two days; bougies are passed at the end of a week. The ultimate fate of the sac after cutting its wall has not yet been determined, but the outcome in three cases lead the author to conclude that the procedure is easily accomplished, is probably safe, and results in a clinical cure.

Bevan records a case of pulsion diverticulum of the esophagus successfully treated by the Sippy-Bevan operation, which is substantially as follows: A long incision is made over the sternocleidomastoid muscle from clavicle to angle of jaw; the sternocleidomastoid muscle is drawn to the outer side and the omohyoid muscle divided between two clamps. The inferior thyroid artery is clamped at two points, divided, and each cut end ligated; with a blunt retractor the carotid artery and internal jugular vein are carried laterally and the upper part of the esophagus exposed. With blunt dissecting forceps the upper portion of the diverticulum is then secured, care being exercised to prevent rupture; arming the fingers with a piece of gauze the sac is then gradually drawn from the thoracic cavity into the operative field. The sac is obliterated by a series of vaselined linen pursestring sutures and invaginated into itself and the esophagus. In the case reported four pursestring sutures were used, the first three being of linen and the final suture of iodine gut. "This was done because the three linen sutures will be passed into the esophagus eventually and the last pursestring suture of iodine gut will, of course, be absorbed and produce firmer cicatrix." Depending upon its size, therefore, the sac may be obliterated with pursestring sutures alone, or, if so large that its entire inversion into the esophagus might produce obstruction, it may be about two-thirds obliterated with pursestring sutures and then five or six longitudinal suture inserted. The after-management is important. The patient is given liquids by rectum for twenty-four hours, and later fed by a rubber tube passed through the esophagus into the stomach, or into the esophagus well below the point of the diverticulum. (Bevan).

Gaub and Jackson devised a plan of operation in which an esophagoscopist assists the surgeon by pushing the diverticulum outward into the external wound with the inserted esophagoscope; the pouch is seized with forceps by the surgeon, after which the esophagoscope is withdrawn from the pouch and inserted deeply into the subdiverticular esophagus. It then only remains for the surgeon to amputate the saccular redundancy. The advantages claimed for the operation are: (a) time-saving, which is especially important in senile, feeble patients, (b) ease of locating a small diverticulum, which when empty as it must be for operation is often difficult to find, (c) accurate removal of the proper amount of redundancy to effect a cure and prevent recurrence without risk of future stenosis. The authors advise the use of intratracheal insufflation ether anesthesia, which not only removes the anesthetist far from the operative field, but renders the patient safe from the risks of glottic spasm so often induced by irritation of the vagus or recurrent.

Leffler describes a female of thirty-four who had extreme idiopathic dilatation of the esophagus, also a pulsion diverticulum opposite the junction of second rib and sternum. Recurring bronchitis with lassitude suggested pulmonary tuberculosis, and the esophageal anomalies were only casually discovered during roentgenoscopy. The large diverticulum had given percussion findings simulating those of a tuberculous cavity, but there was no reaction to tuberculin.

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SENTRIES AND HEALTH.

"The greatest asset of a nation is the individuals which compose that nation, and the greatest asset of the individual is health." Without health all opportunities of endeavor are valueless. The individual who is broken down in health is not an asset to his country, but a liability, a lien, either upon his friends, his own capital, or upon society.

In times of crises like the present, "The race is not to the swift, but to the strong." The sick and ailing cannot be called into any field of endeavor where physical endurance is put to the test. The weak are but an economic encumbrance.

As the chain is no stronger than the weakest link, so is each individual a link in the community life. One essential to the well-being of a community is the immediate investigation and abatement of disease. The individual who goes about scattering disease germs is weakening every link in the great chain. Like the sentry who stands on watch while the camp is asleep, each individual owes a duty to his community to conserve the public welfare by promoting sanitation and healthful conditions and by eradicating foci of infection.—*Public Health, Michigan State Board of Health.*

RESPONSIBILITY OF THE SOLDIER TO KEEP FIT.

The best protection that government and people can give will not take from the individual soldier the responsibility for not putting his health needlessly in jeopardy. Every failure to prevent a case of venereal disease in a soldier reflects on the adequacy of the steps which the Army and the States are taking to safeguard against such incapacity, but it reflects to a still greater degree on the individual soldiers who ran a known and unnecessary risk of destroying his usefulness in the army and of serious future danger to wife and children.—*Public Health; Michigan State Board of Health.*

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

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A PLEA FOR THE CONSIDERATION OF SURGERY IN THE TREATMENT OF SUPPURATIVE CONDITIONS OF THE LUNG.

The time is not so distant when the opening of the abdomen for the removal of the diseased appendix or even for the socalled "interval" appendix operation was a weightily discussed subject. Sometimes the intervention of general peritoneal infection with its inevitable consequences cut short the discussions and considerations. There grew up, during this period a race of surgeons, brave enough to risk the dangers of the moment and wise enough to study means to overcome them. That modern surgery has developed to the point it has reached today is proof enough of their far-seeing wisdom. Unfortunately, the domain of surgery, aside from the special branches, seems, in the minds of too many of our modern surgeons, and all too many of our internists, to be limited to below the diaphragm. The bold spirit who invades the thorax is like one who enters the wildest jungle—an adventurer who is lucky to escape with a life—in this case his patient's. Should the patient recover the knowledge is received with a smile and a shrug of the shoulders by the self satisfied Tory who with his smug pseudo science sits still and expects the rest of the world to do the same.

It is conceded, and by none more freely than by those who know the most about it, that the opening of the chest cavity and the surgical manipulation of the lungs is fraught with danger. Any operation is one of first magnitude and only to be performed by one well versed in the technic and fully conversant with the dangers and untoward possibilities. But after all the same can be said of the surgery of any other region and of any other kind. It is true that the mortality from the operation is high. It is acknowledged that the percentage of recoveries is small. However, no one will have the temerity to deny that one of the main reasons for the success of surgery of the abdomen is the early recognition of surgical indications by the internist who sees the patient first and knows the difference delay will make.

Patients offer the greatest hope for recovery in inverse ratio to the extent of the pathological process. Be the suppuration an abscess with walled off cavity or a dilatation of the bronchi and bronchioles with suppuration, the more limited the suppurating area the better chance the patient has. If removal of the suppurating area—the logical procedure in other parts of the body—will cure the patient, obviously partial removal will not. Therefore it becomes apparent that if the suppuration tends to spread, speedy operation offers the patient his best hope. It must be admitted that "expectant" treatment and ineffectual interference, which cause a spread of the disease process, will only jeopardize the patient further. If the suppuration be confined to one lobe of one lung that lobe can be removed. If, however, an entire lung be involved or, perhaps, both lungs, it is difficult to anticipate any good results to be achieved by the removal of a part of the offending organ. The internist who sees these patients first and who can by means of the *x*-ray and bronchoscopy definitely localize the process is neglectful of his duty if he does not appreciate the indications early, before the process has spread, and offer the patient the chance of a surgical cure.

That the operation is dangerous cannot be denied; that the results of non-interference are deplorable must be admitted. The situation then resolves itself into subjecting the patient to a fearful risk, taking him deep into the Valley of the Shadow, in return for which, if he recovers he will be a well man. To one familiar with this class of patients with their horrible expectorations that forbid them the company of their fellows the risk does not seem so great.

As opposed to operative methods what has medical treatment to offer? Expectorants for a time in the beginning, open air treatment (many of these unfortunates first receive diagnoses of tuberculosis and are treated on that basis until beyond the help of surgery), artificial pneumothorax when the great majority if not at all, have adhesions that will prevent the collapse of the lung, even granting that its to be a method whose results justify its use. Expectant treatment can merely wait to see what will happen, knowing that only one thing can happen and then pharisaically shrug its shoulders and go on to the next great question mark.

It is undeniable that occasionally a case is cured spontaneously, but then only early in the disease and very, very rarely. True, the report of these instances magnifies them and their occurrence is gratifying but does not justify us in scientifically praying for miracles. Would any of the advocates of "Expectancy" offer it to a patient with a carcinoma of the breast? There are instances of spontaneous cure of that malady. With the knowledge that there may be a recurrence and that the risk from the operation may have to be lived through again, are patients not urged to early operation as the one promising means? Is it not just to grant and offer the only chance to a patient, who is willing to take all his chances at once, to rid himself of a loathsome, foul disease, with the alternative of coming out of the ordeal well—or not at all? L. G. K.

PRIMARY EXCISION AND SUTURE.

While war has been responsible for many modifications and adaptations of surgical technic, together with the introduction of a varied assortment of antiseptics, there have been few evidences of actually new methods. For this reason, the primary excision of wounds in the stage of early contamination, followed by primary closure, stands out with greater prominence.

As Bloodgood points out (*Progressive Medicine, Volume XXI, 4*), the immediate suture of incised lacerated wounds is by no means novel, no more than the removal of foreign bodies to prevent infection, "but the deliberate resection of a huge gunshot wound, removing all the foreign bodies and all the contused and devitalized tissue, as one would resect a malignant tumor, and then the primary closure, is an achievement of this war." Hull states that if the infected wound can be excised within the first twelve hours, an almost aseptic result can be achieved regardless of the further treatment. If the excision is postponed until a state of inflammation exists, the prevention of infection is uncertain even though larger areas of tissue be removed.

Shell and shrapnel wounds are generally infected, and, therefore, should be excised promptly whether the missile be retained or not. Wounds with considerable destruction of tissue, readily subject to infection, also call for free primary excision. In a sense, the primary excision of wound and bullet tracks may be regarded as more potently prophylactic than any other form of treatment. The significance of primary excision lies in its applicability in such diverse fields of surgical treatment as compound fractures, cranial injuries, wounds of joints and amputations. According to Hull *Surgery of War,* "septic compound fractures have been treated by the excision of a cone-shaped piece of tissue enclosing the septic tract, with the result that the fractures have healed like aseptic fractures."

Primary excision does not necessarily involve primary suture. After the removal of the potentially infected area, which may contain missiles or other foreign bodies, as bits of clothing, dirt, etc., hemorrhage is controlled, and further treatment determined. In theory, a primary excision should be productive of a thoroughly clean wound which can be made to heal by primary union after suture. Unfortunately, practice does not always support the theoretical conclusion. The greater the degree of infection previous to primary excision, the greater is the hazard of primary closure. The insufficient removal of tissue may be followed by a late sepsis, or the removal of too much tissue and prompt closure may result in loss of function which cannot be corrected without re-opening the wound.

Primary suture naturally is desirable, but it must be undertaken only when there is certainty of the complete removal of the infected area. A delayed primary suture avoids the risk incident to primary closure and is followed by rapid healing, which is a great advantage over the ordinary prolonged treatment of open wounds.

The introduction of this special treatment of lacerated, punctured, or contused wounds, including foreign bodies, and possibly infected material, represents a distinct advantage in surgical technic. It merits a place in the ordinary procedures of industrial surgery. It demands, however, a higher degree of attainment in surgical judgment and procedure. Primary excision and primary suture promise to be of tremendous advantage in preventing waste of function, delays incident treatment, and complications and sequelæ, so common to septic involvement of wounds. Is is a form of treatment which tests the surgeon and tries his surgery. It merits continued use under normal surgical conditions. I. S. W.

POSTOPERATIVE PNEUMONIA.

Attention has recently been called to the fact that postoperative pneumonia is a far more frequent complication than is ordinarily acknowledged. Whipple* points out that the most important predisposing factors are: recent or concurrent inflammation in the upper respiratory tract; pulmonary congestion; inhibition of normal respiratory movements as a result of an abdominal incision; debilitated states; and an increase in the number and virulence of the pneumococi in the winter and early Spring. The *x*-ray has proven valuable in demonstrating the lesion before physical signs can be elicited.

After certain classes of operations—notably those in the upper abdomen—postoperative pneumonias, varying from a small patch centered about some bronchus, to a full blown consolidation limited by the boundaries of one or more lobes, are frequent, are causes for much concern, and contribute appreciably to the total mortality. In a certain proportion the character of the clinical course gives sufficient reason for the assumption that the process is a reaction to bacterial infection, induced or precipitated by an impoverished general condition; and it is reasonble to interpret the complex as an intercurrent infection, interrupting the smoothness of the convalescence to which one is ordinarily accustomed.

In other cases the clinical course lacks the usual markings of a pneumonia of the lobar or lobular type, and the impression is lacking that the condition owes its existence to bacterial trauma. In a few of these the shape and location of the compromised lung tissue, and the characteristics of the physical signs, indicate rather clearly that the process is of an embolic or infarctive nature; and the assumption has been frequently proven true at postmortem examinations. It is very possible that the great majority of the pulmonary complications, occurring in the postoperative period, owe their presence to embolic and infarctive phenomena.

Frequently the presence of physical signs in the lungs—rales of some kind, or an area of dullness—does not correspond with an actual area of consolidation; and the finding of fairly normal and crepitating lung, where one expected a consolidated area, is most disconcerting at the postmortem examination. These signs are most frequently found where there has been marked abdominal distension and a resultant compression of the thoracic contents; or they are due to changes in the vascular equilibrium of the pulmonic circulation.

A. O. W.

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*Whipple: Surgery, Gynecology, and Obstetrics. 1918, 26, 29.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

"PRACTICAL NURSES."

The Bulletin of the *Chicago School of Sanitary Instruction*, January 18, 1919, bears, over the signature of John Dill Robertson, Commissioner of Health, a criticism of the nursing system which has failed to make adequate provision for the development of "practical nurses." His plea for the development of a group of nurses capable and willing to do housekeeping for the sick has special interest at this time when the shortage of nurses has been so thoroughly exemplified in the futile efforts of the country to provide nursing care for the victims of influenza and pneumonia. He advocates that hospitals should make provision for the training of two classes of nurses. "The first grade of training to conform to that now required, except that the time be two instead of three years for completing the course. The second class to be known as practical nurses, whose course shall consist of six months of intensive training. At least one-half of this time should consist of practical lectures and demonstrations with frequent recitations, quizzes and examinations as are conducted in any college or university." He demands a knowledge of practical housekeeping and domestic science as an important requirement rather than an educational qualification which would eliminate all save high school graduates.

While an appeal to the State Legislature may be needed to amend present nursing laws, he suggests that in event of failure to secure relief from the Legislature, the City of Chicago might enact a law licensing women as "practical nurses." The licenses would be issued by the Department of Health only after the applicants had passed a satisfactory examination as "Practical Nurses," and "should be subject to revocation upon evidence showing extortionate charges or any unethical conduct." He further recommends that practical nurses should receive not to exceed one-half the fee now paid to registered nurses.

There is considerable merit in the suggestion of Dr. Robertson, but it is doubtful if the fee which he has suggested would place the practical nurse within the financial reach of the mass of the people actually needing such nursing care. Unfortunately, during the epidemic, trained nurses did not hesitate to follow the law of supply and demand to the extent of doubling and even quadrupling their fees.

Municipalities, in rushing to give nursing assistance, not infrequently paid normal nursing fees to persons totally incompetent to perform the duties required of even nursing housekeepers. The crux of the practical nurse problem lies in the availability of a large number of individuals capable of performing ordinary housekeeping duties, and giving the simplest attention to the sick in accordance with directions left by the attending physician, at a cost far more moderate than any that has been proposed at this time. The average family cannot afford to pay three dollars a day for nursing attention during a case of illness covering one or more weeks without suffering in some other direction. The extension of district nursing, with an auxiliary group of nursing aids serving as a reserve force for emergencies, would be of greater use during an epidemic than a flood of incompetents such as have been called into service under the stress of a shortage of nurses.

At the same time, it cannot be gainsaid that the suggestion emanating from Chicago possesses much force. There must be some available nursing assistance for the general public other than that secured in the highly trained and technically developed nurse, who has gleaned her experience after three years of training and service under hospital direction. There is a danger, however, that stressing the inferior brand of nurse may result in lowering the standards of nursing in the community, a danger which must not be forgotten. The "Practical Nurse" would be impractical if real nursing were required. As a makeshift, a convenience, she would fill a great need. As a home assistant, she would play an important part in carrying through many families in time of disease and distress, when she would really be more human and more comforting than the ever reliable trained nurse.

Extending Rehabilitation in Industry.

It was natural that an attempt should be made to make provision for the vocational rehabilitation of all persons disabled in industry or otherwise patterning the system after the one adopted for the rehabilitation of soldiers, sailors and marines. Occupation as a means of overcoming physical handicaps in the economic sense has been placed upon a reasonably safe foundation. By putting more ability into disability, power may be assured and a higher degree of independence results.

According to *The Vocational Summary*, January, 1919, the Committee on Education and Labor of the United States Senate reported favorably upon a bill designed to conserve the labor power of the country, by providing an annual grant to the states giving vocational education to persons so disabled in employment as to be unable to continue it. The fact recorded, though by no means new, that three-quarters of a million casualties occur annually among wage workers in all occupations, for whom no particular provision has been made in the matter of retraining or placement, indicates the advantages to be derived by the extension of state and national aid in the re-development of old skill or the fostering of latent talents.

Leaving aside the problems of possible labor shortage, it is patent that a humane interpretation of our responsibilities to those injured in the industrial work of the country makes it just and reasonable to extend to the workers of the land the same opportunities for economic rehabilitation as have been offered to the combatant forces. The same arguments obtain for both groups of workers. The proposition itself contains nothing new, save possibly the principle of federal aid in place of ordinary compensation. This movement appears to be in the right direction. It is not merely a matter of business investment, it involves more than salvage and conservation of human resources. It inaugurates a policy for increasing the personal potentialities of a large army of persons who have become "disabled through no fault of their own, in the performance of duties necessary to the comfort and the prosperity of the country."

Obviously, the benefits of thorough training and adaptation in industry should be extended in principle. It appears to give unusual benefits to the handicapped as a further exhibition of a tendency to penalize normality. More attention and care are lavished upon feeble minded, for example, than can be recompensed in the form of financial returns to the community, but this expenditure represents a type of insurance premium which has its justification. Minor injuries might be the excuse for securing vocational and educational opportunities denied to the individual not suffering from such handicap. All steps taken towards promoting the welfare and benefit of those injured in industry should be carefully safeguarded on the basis of increased vocation, education and guidance before entrance into industry, physical examination at the time of entrance into employment, and a more or less complete system of safety devices and shop hygiene committees with a view to keeping down the accident rate in every way. The principal danger that is involved includes the possibility of lowering the carefulness of employees through giving them further assurance of unusual benefits in the event of slight injuries, rendering them unfit for their specific process of work. This criticism, however, is by no means of serious importance when considered in relation to the magnificent advantages contemplated in the bill, which thus far has not been enacted into law.

Certainly the theory of universal interdependence requires society as a whole to bear the burden of industrial disabilities, and the nation should be willing to assist states in promoting the welfare of citizens unfortunately injured. As a means of preventing dependence, lessening criminal tendencies, and raising the economic value of manhood, the problem deserves most thoughtful consideration. Probably no solution represents a greater degree of fairness from the standpoint of those paying the costs and from the viewpoint of those receiving the benefits, than a federalized system of vocational rehabilitation acting through existent boards and bodies within the jurisdiction of states or preferably through the centralized Federal Board for Vocational Education.

Book Reviews

United States X-ray Manual. Prepared under the Direction of the Division of Roentgenology. 506 pages with 219 illustrations. $4.30 net. Paul B. Hoeber, New York.

As an elementary study of *x*-Ray Physics and Interpretations this book is undoubtedly the most interesting, concise, and instructive compilation. It is divided into a number of chapters, the largest of which, as is to be expected for Army instruction, is the one on *x*-Ray Physics. Bearing in mind that the demand for Roentgenologists during the war required the training of a great number of men without previous experience in this specialty,—it is safe to say that the methods as outlined in this manual afforded the beginner a most excellent opportunity to grasp so complex a subject without great difficulty. The instructions are simple and not involved by technical discussions.

The chapter on Localization, the most important in Army work, gives the reader a clear idea of the various methods employed. The "Near Point" method, however, is not mentioned, which is regrettable.

A description of Army Apparatus and a résumé of *x*-Ray technic and diagnosis follow in their order.

This book serves a most useful purpose.

Radiography and Radio-Therapeutics. Robert Knox, M.D., Consulting Radiologist, Great Northern Hospital, London; Director, Electrical and Radio-Therapeutic Department, Cancer Hospital, London, etc. Part 2: Radio-Therapeutics. 220 pages with 15 plates and 100 illustrations. The Macmillan Co., New York.

In dealing with Radio-Therapy, as the author has attempted in Part 2 of his excellent book, the field covered is naturally an experimental one. Radio-Therapy, while successful in many instances, is not uniformly so in cases of similar or like conditions. The author has wisely included in his text the opinions, technic, and results of other authorities and leaves the choice to the reader. As this branch of science stands today, this volume covers the field fully and permits an insight into the progress thus far made.

Books Received

Surgery in War. Alfred J. Hull, F.R.C.S., Lieut.-Col., Royal Army Medical Corps; Surgeon, British Expeditionary Force, France; Late Lecturer on Surgical Pathology, Royal Army Medical College, Milbank, and Surgeon, Queen Alexandra Military Hospital. With a Preface by Lieut.-Gen. T. H. J. G. Goodwin, C.B., C.M.G., D.S.O., Director-General, Army Medical Service. Second Edition. With 210 illustrations. Philadelphia: P. Blakiston's Son & Co., 1919.

Neoplastic Diseases. A Text-book on Tumors. James Ewing, M.D., Sc.D., Professor of Pathology at Cornell University Medical College, New York City. Octavo of 1027 pages with 479 illustrations. Philadelphia and London: W. B. Saunders Company, 1919. Cloth, $10.00 net.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences, Edited by Hobart Amory Hare, M.D., Professor of Therapeutics, Materia Medica, and Diagnosis in the Jefferson Medical College, Philadelphia, Physician to the Jefferson Medical College Hospital, One-Time Clinical Professor of Diseases of Children in the University of Pennsylvania, Member of the Association of American Physicians, etc. Assisted by Leighton F. Appleman, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia; Ophthalmologist to the Frederick Douglass Memorial Hospital and to the Burd School; Ophthalmologist to the Polyclinic Section of the University of Pennsylvania. Volume IV. December, 1918. Diseases of the Digestive Tract and Allied Organs, the Liver, Pancreas and Peritoneum—Diseases of the Kidneys—Genito-Urinary Diseases—Surgery of the Extremities, Shock, Anesthesia, Infections, Fractures and Dislocations, and Tumors—Practical Therapeutic Referendum. Lea & Febiger, Philadelphia and New York, 1918.

The Hearts of Man. R. M. Wilson, M.B., Late Assistant to Sir James Mackenzie, under the Medical Research Committee. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, Warwick Square, E. C., 1918. 173 pages.

Practical Dietetics. With Reference to Diet in Health and Disease. Alida Frances Pattee, Graduate, Department of Household Arts, State Normal School, Framingham, Mass., late Instructor in Dietetics, Bellevue Training School for Nurses, Bellevue Hospital, New York City; former Instructor at Mount Sinai, Hahnemann, and the Flower Hospital Training Schools for Nurses, New York City; Lakeside, St. Mary's, Trinity, and Wisconsin Training Schools for Nurses, Milwaukee, Wis.; St. Joseph's Hospital, Chicago, Ill.; St. Vincent de Paul Hospital, Brockville, Ontario, Canada. *Twelfth Edition.* Revised and enlarged. A. F. Pattee, publisher, Mount Vernon, New York, 1918. 469 pages. Price $2.00.

The Pawns of Fate. Paul E. Bowers. The Cornhill Company, Boston. 210 pages. Price $1.25.

Autotherapy. Charles H. Duncan, M.D., Discoverer and Founder of Autotherapy; former Mechanical Engineer of the Illinois Steel Company; Co-founder of the Volunteer Hospital; Attending Surgeon and Genito-Urinary Specialist, Volunteer Hospital, New York City, 1905-1914; Honorary Member, Veterinary Medical Association, New York City. Published by Dr. Charles H. Duncan, 2612 Broadway, New York City.

Progress in Surgery

A Résumé of Recent Literature.

Lymphatic Disease in Children Simulating Appendicitis. (With a report of seven cases.) Harold de B. Barss, M.D., *American Journal of Diseases of Children*, June, 1918.

Barss reports seven cases in children under puberty. These cases came to operation with symptoms suggestive of recurring attacks of appendicitis, *i. e.*, abdominal pain, nausea, constipation. The pain was over the right lower quadrant. There was no fever nor leukocytosis; the Wassermann reactions were negative. The appendix in every instance showed marked lymphoid hyperplasia.

Barss believes that this lymphoid hyperplasia of the appendix represents a more general lymphoid disturbance throughout the patient. Removal of the appendix stopped the symptoms which brought these patients to the surgeon.

Lacy claims that cultures from some cases of sinusitis will show a quasi-negative bacillus—even in direct smears. These should be looked upon as influenza bacilli. Similarly cases of indefinite etiology of meningitis may show influenzæ bacilli if cultures are made upon blood aga plates, using the centrifugal sediment of the spinal fluid picture according to Vaughan. For the last five type the x-ray is particularly valuable in making a correct diagnosis.

The sinus cases of influenzæ infection should have early pneumonia prevalent during the present influenza epidemic) and its signs masked. However, diminished breath-sounds with flatness should call for diagnostic aspiration. 4. Massive empyema; this condition occurs infrequently. 5. Suppurative polyserositis. 6. Interlobar empyema. 7. Pexamediastinal pus. 8. Polylocular empyema. 9. Latent empyema. All present rather a distinct and ample drainage.

Splanchnoptosis. G. N. Kreider, *Journal American Medical Association*, December 21, 1918.

The writer strongly supports the ideas advanced by Glénard as regards the evil effects of splanchnoptosis, and its frequency. Only occasionally, he says, is the stomach in its proper situation, according to the anatomic textbooks, and the same is true of the transverse colon. Its common causes are improper habits as to eating, use of high heeled shoes and corsets, fashionable constricting belts and bands, etc. He asserts that it is perhaps four times as serious a matter in females as in males, though it may occur at all ages and in both sexes. While many people seem to get along without any serious symptoms from prolapsed organs, the condition is that of many hernias and potentially dangerous. Many cases may be cured by proper bandaging, posture and dieting, and operation should not be resorted to until other methods have failed. We have changed our conceptions as to the ordinary forms of colitis, and no longer consider it as of nervous origin. Lane's operation of extensive resection of the bowel is rarely necessary, but operations attaching the stomach and intestine to the abdominal wall are capable of giving good results, even if theoretically objectionable in some regards. Duret of Lille first performed a gastropexy, but the operation has been considerably elaborated by others, notably by Rovsing of Copenhagen. The operation is not difficult, and can be performed on patients desperately emaciated. Bsides the sex difference, the aged suffer more on account of their previous bad habits in youth and middle life. Even new-born infants, however, may be victims of the condition. All these points are amplified in the paper. Usually the first treatment required for splanchnoptosis is six weeks' rest in bed, the foot of which is raised twelve or more inches according to the case. Forced feeding and proper bandaging with intervals of rest follow this measure. Kreider describes the operation of gastropexy, and reports four cases thus operated on and relieved.

Phlegmonous Gastritis. F. I. Shatara, *Journal American Medical Association*, December 28, 1918.

A case of phlegmonous gastritis ending fatally is reported because of its rarity, only 100 cases having been reported so far. The submucous coat of the stomach is oftenest affected. It is usually secondary, occurring in the course of some other disease. There are two types, the diffuse and circumscribed have been described. The etiology is not definitely known, but a bacterial origin is most probable, and streptococci are the organisms most commonly found. In the case reported, streptococci were demonstrated by the Gram-Weigert test. In secondary cases the disease is probably carried by the blood stream. Symmers failed to produce the disease in animals by feeding ground glass, and inoculating streptococci and pneumococci. While its relation to gastic ulcer and cancer is unknown, the pyloric region seems to be the site of choice, though the entire stomach may be involved. The onset is sudden with pain and great disturbance, and the issue is rapidly fatal in from one to seven days. The diagnosis during life is, at best, a guess, though Chovstek is said to have made one such diagnosis.

The Treatment of Gastric Ulcer by Gastroenterostomy. C. H. Mayo, *Minnesota Medicine*, January, 1919.

The best type of gastric cases for surgery is that in which every method of medical treatment has failed, or the patients have become tired of the rigid diet and care which is necessary to relieve or to prevent relapse. Such patients greatly appreciate the relief obtained through gastroenterostomy and the ability to return to work with the diet that can be obtained by them in their station and environment.

Ceasarian Section Under Local Anesthesia. W.M.Brown, *Journal of Obstetrics*, December, 1918.

We are now in a position to say that, in certain types of cases, abdominal delivery, under a local anesthetic, offers the safest means of terminating pregnancy, Brown believes, and that this method is entitled to a definite and permanent place in our records of progress. This procedure is indicated in whom, by reason of some concurrent or intercurrent disease, a general anesthetic is contraindicated and for whom a diifficult labor is unsafe. He divides these cases into three groups: I—Patients with advanced cardiac disease, in whom there is actual or impending muscle relaxation. II—Patients suffering from severe toxemia, hepatic and renal insufficiency, and impending eclampsia. III—Patients suffering from active pulmonary tuberculosis. Histories are cited to illustrate these three groups. Two important elements are necessary for success: I—Secure the confidence and cooperation of the patient. II—Thorough infiltration of the operative area and delicacy of manipulation of the exposed tissues and organs involved in the operation—the principal pain resulting from dragging upon, and manipulation of, the uterus and intestines.

Does Surgery Ever Cure a Case of Cancer? . A. Tate, *American Journal of Obstetrics*, December, 1918.

Tate believes a complete eradication of the disease is questionable in most cases. But it is the duty of the physician, unless there be evident metastases, and if the patient can stand the operation, to operate without delay, even if there be only temporary improvement. One case is cited by him to show how after an early and complete operation two years ago, the patient is now a well woman; another case with abdominal metastrases had a tumor of 8 lbs. plus weight removed from the right ovary, is now in perfect health after three years; while a third case after complete removal of the uterus, ovaries, and tubes, but no removal of the growth which was in the right broad ligament. After extensive *x*-ray treatments has resulted in a probable cure. All of the above were proven inalgenont microscopically. But he believes that a hopeless case where there is no chance for even the prolongation of life, should never be subjected to surgery.

Forceps Rotation of the Head in Persistent Occipito-posterior Positions. A. H. Bill, *American Journal of Obstretrics, etc.,* December, 1918.

Bill uses a modified Scanzoni moneuver. The following are the steps:

I—An absolute diagnosis of position.

II—A true cephalic application of the forceps.

III—Rotation without any traction whatever; the extent depending upon the position.

IV—The sweep of the handles of the forceps through a large circle, after raising them first to favor flexion.

V—Fraction to fix the head in its new position.

VI—The application of the posterior blade first in the second application of the forceps.

The time at which forceps should be applied varies in different cases, but as a rule, there should be no interference with the first stage of labor, and a reasonable time allowed for spontaneous rotation.

The Advantages of Rectal Over Vaginal Examinations During Labor. R. A. Bartholomew, *American Journal of Obstetrics, etc.,* October, 1918.

Bartholomew believes that, while rectal examination cannot entirely replace vaginal examination, in ordinary practice it suffices in 19 out of 20 cases because of the adaptability of it to the anatomy of the parts. It also removes the necessity for repeated sterilization, and removes any danger of infection. The accuracy of rectal diagnosis during labor, after several trials, is sufficient in normal cases to be of value. The cervix is usually felt as a thick rim, which disagrees with effacement of the cervix. The presentery part can there be felt. Several pitfalls are mentioned and their diagnosis given. He considers rectal examination particularly useful when tests of labor are given to a patient before a Ceasarian or pubiotomy because of lessened dangers of infections and membrane rupture. Finally, he advises all men doing obstetrical work to familiarize themselves with this method, and then check themselves up by vaginal examination so that he will be benefited by the ease, accuracy, time-saving ability and safety that this method gives.

Conservative and Radical Methods of Treatment in Obstetrics. Austin Flint, *American Journal of Obstetrics, etc.,* November, 1918.

That the pendulum is beginning to swing back towards conservative methods of treatment is Flint's belief. Articles increasing the restrictions imposed upon radical methods are becoming more frequent. The Ceasarian section is being done far too frequently and on much too slight or relative an indication—the fact that "once a Ceasarian, always a Ceasarian" is true is being lost sight of, and because of some trivial condition, a section is done. Increased conservatism should also be practiced, he believes, in the treatment of eclompsea, especially as regards operative delivery. The conservative treatment includes early diagnosis by frequent laboratory and clinical observations with immediate institution of the eliminative treatment—if no prompt and absolute disappearance of all symptoms occurs, the pregnancy should be terminated. After the occurrence of convulsions, he believes that a moderately conservative treatment is best, because he believes that the sooner a uterus is emptied, the sooner a patient begins to improve. The Straganoff method of large doses of morphine, and doing nothing to hasten the delivery, he regards as one of the great advances in modern treatment, but he considers morphine dangerous, unless given merely to control the convulsions. Expectant treatment if unfruitful should be followed by bag introduction. There should be no other operative measures used—version and breech extraction, pomeroy bags, manual delatation, forceps, cranestomy, or vaginal or Ceasarian section, especially forcible delivery through an unprepared canal. This he claims is due to the fact that an eclamptic is a poor surgical risk. The usual eliminative and drug therapy is indicated before the induction of labor and following it—fluids, colon irrigations, hot packs, morphine, stomach lavage, and induction of free perspiration. The least harmful operation and most often performed is a simple low forceps. Breech and transverse presentations have to be extracted by version and breech extraction. But all manipulations should be restricted as much as possible. Of 14,000 deliveries at the Manhattan Maternity Hospital, 91 or 1 in 154 were eclamptic cases. Tables are given to show the relative mortality of the conservative and radical methods of treatment. The conservative method had a material mortality of 15.1% and a fetal mortality of 33.3%, while the radical operative treatment had a material mortality of 29.2%, almost twice as large, and a fetal mortality of 73.1%, more than twice as large. These figures he considers sufficient to impress the value of the conservative method. In addition, uterine rupture, seven laceration and other complications were observed in the radically treated cases. He especially emphasizes the fact that a large proportion of eclamptic cases can be prevented by an earlier recognition of the toxic condition, and valuable lives saved thereby.

Pathologic Conditions of the Pelvic Viscera, the Result of Induced Abortion Causing Sterilization, Disclosed by Abdominal Section. F. Reder, *American Journal of Obstetrics, etc.,* December, 1918.

Reder had a series of eight cases, who had a grand total of 56 induced abortions, all instrumentally produced after being preceded by certain medical treatment. The outstanding result of consequence was sterility, which Reder believes is more liable to follow instrumentation than medicinally induced abortions. After two to three years of treatment, which Reder believes should be the limit for local treatment, abdominal section was performed on each of them. A strange similarity of pathologic conditions was found in all cases.

Conservative corrections of these conditions were undertaken so that normal relations were obtained. As a result, two went to full term within 20 months, while the other six operated on within the last four years are still sterile. A definite prognosis as to certainty of pregnancy after exploratory abdominal sections cannot be given, therefore, Reder believes.

Accidental Removal of Intestines Through the Vaginal Vault. E. J. Ill, *American Journal of Obstetrics,* January, 1919.

In an effort to make clear what the possibilities are in the accidental removal of a portion of the intestines through the vaginal vault, Ill performed several experiments, and the following conclusions were drawn:

First: That any portion of the bowel can be pulled away by traction with a forceps through a rent in the uterus or vagina.

Second: That the point of separation will be the junction of the bowel with the mesentery.

Third: That in some subjects the separation will be extraperitoneal in a large measure.

Fourth: That the mesentery *cannot* be pulled away from its origin of the spine or elsewhere.

Recognition and Management of Labor Injuries. A. J. Skeel, *American Journal of Obstetrics, etc.,* January, 1919.

Skeel believes that too much emphasis has been laid on the danger of post-partum examinations, which are really essential for good end results in labor injuries. But he believes that limiting or entirely avoiding vaginal examinations during labor is an essential preliminary part of the technic of primary repair of labor injuries. Immediate inspection of the cervix with primary repair of its injuries should be undertaken. This reduces the risk of subinvolution and of uterine displacement to a minimum. The routine use of buried sutures in the perineum for the repair of second degree lacerations permits, he believes, accurate coaptation and restoration of the parts. Perineal lacerations are more easily repaired than is subpubic damage. Therefore, slow delivery and skill in directing the small diameters of the head through the vulvar ring should be sought. Forcing the head against the pubic arch produces more damage than it prevents.

The Pathology of Chronic Metritis and Chronic Subinvolution. O. H. SCHWARTZ, *American Journal of Obstetrics, January,* 1919.

In a beautifully illustrated and well-written article, Schwartz comes to the following conclusions:

1. In general his views coincide with those of Shaw, whose pathological classification, namely, chronic subinvolution, chronic metritis, and hypertrophy, is an ideal one, of which only a small percentage—12%—has an overlapping which concerns chiefly the first two.
2. Chronic subinvolution alone is by far the most frequent cause of enlarged uteri, causing hemorrhage, pain, or leucorrhea.
3. The thickness of the uterine wall is due, in order of importance, to an increase of the elastic tissue, edema and liquefaction of the connective tissue, and hypertrophy or enlargement of the individual cells.
4. Chronic metritis does exist as a true inflammatory condition; and is frequently responsible for the symptoms in these enlarged uteri.
5. Chronic metritis, locally, is never primary; it is secondary to chronic endometritis, chronic salpingitis, or chronic inflammation within the pelvis.
6. Chronic subinvolution and chronic metritis may coexist in the same uterus.
7. Hypertrophy of the uterus has a pathologic basis of its own; it may occur in both multiparous and nulliparous uteri.
8. Chronic pelvic inflammation is seen occasionally only in connection with chronic subinvolution; and, therefore, other factors must play a greater rôle in the production of this condition.
9. The thickness of the wall in the majority of cases of chronic metritis and chronic subinvolution is due, partially, to the increase of the musculature.
10. The term "chronic metritis," used clinically, should be abolished; the term chronic subinvolution might be substituted in cases of multiparous uteri which are definitely enlarged and cause symptoms without evidences of pelvic inflammation—this would probably include over 80% of uteri which, pathologically, show signs of chronic subinvolution. The term chronic metritis might be applied in those cases in which there is evidence of pelvic inflammation, in connection with a more or less immovable uterus —this would embrace a greater portion of true chronic metritis, as well as those in which there is a distinct overlapping of both conditions.

Fractures of the Spine. NORMAN SHARPE, *Journal American Medical Association,* October 26, 1918.

Fracture of the spinal column with and without injury to the cord is the subject of Sharpe. When a fracture of the spine occurs, he says, we ordinarily think of it in terms of cord symptoms. There are, however, a large number (estimated at one third of all cases by Pearce Bailey) in which the cord and roots escape damage. Unless careful study is made of these cases the diagnosis is apt to be "simple sprain or contusion." Sharpe has recently reported a case in the *American Journal of Medical Sciences* of fracture of the second cervical vertebra without injury to the cord. Since that report he has seen five other cases in some of which it was difficult to see how the cord could have escaped injury. In four of the cases the vertebral body was fractured, and in two of them almost completely crushed. Yet the patients were able to stand and move after the accident, showing that crushing of the veretebral body, like removal of the laminae or posterior arches, does not completely disable, the main support being the articulation on the transverse processes. It is rare in fracture by indirect force to injure the cord except by hemorrhage, while the most severe injuries to the cord are seen in the common fracture-dislocations of one or more vertebrae. As was pointed out in the former article, however, complete abolition of function below the lesion in a spinal fracture does not prove that the cord is completely crushed or even damaged beyond repair. Sharpe gives an account of a case where an early laminectomy would have greatly benefited the patient, though the delayed one helped him. The only reliable sign that proves a complete crush of the cord, and the only contraindication to early operation, is a bony deformity so great as to show complete obliteration of the spinal canal. By early operation is meant a laminectomy after the patient has rallied from the initial shock of the injury, and this is possible only when the patient's condition is suitable. In many fractures of the spinal column without cord signs, the fracture has been entirely overlooked. If other injuries are present this is more apt to occur. Careful examination is necessary, for if the patient is able to move, sudden movement or twisting in bed may induce injury to the cord with serious symptoms. The treatment of fractures without cord symptoms is immobilization. If the fracture is high in the cervical region an extension should be made from the collar about the forehead, if in the lower cervical region an extension should also include the upper chunk. After from six to ten weeks, when all pain and tenderness have gone, the plaster may be followed by a stiff leather collar giving greater freedom of movement. If the fracture is in the laminae of the dorsal or lumbar vertebrae, a moulded splint of plater on each side of the spinal column and connected by transverse bands above and below the lesion will be found a satisfactory way of immobilizing the fracture and preserving the normal outline of the spinal processes. Fracture of the veretebral body is best treated by overextension on the Bradford frame. The author's five last cases are reported.

Wounds of the Spine. HAROLD NEUHOF, *Journal American Medical Association.* January 4, 1919.

Neuhof discusses a class of gunshot spinal wounds in which the dura is intact and the paralysis is caused by commotion or concussion or both combined. In the fatal cases a diffuse or a focal necrosis of the affected portion of the cord with a varying degree of edema is found, sometimes destroying all the cord elements at the same level though most frequently some portions remain intact. The presumption is that in cases in which recovery either total or partial occurs, edema was the cause of paralysis. In injuries by shell fragments the chances of recovery are the slightest if the wound is deep seated in addition to the functional lesion. There may be fragments of bone or clot directly compromising the dura, the removal of which is indicated chiefly, however, for reason of infection of the wound. Four cases are reported of this class. The spinal column was fractured in three of them while there was no demonstrable bone injury in the fourth case and in none of them was there any appearance of pressure on the dura and in none of them was it opened. The article is written to call attention to such cases.

Dislocation of Atlas. HAROLD SWANBERG, *Journal American Medical Association,* January 11, 1919.

Swanberg reports a case of anterior dislocation of the atlas following tonsillectomy. The night after the operation the patient's neck became stiff, and continued that way with headache that did not improve. Roentgen examination revealed the condition, six months after it first occurred. It seems impossible that the diagnosis should not have been made before. However, this is the second case of anterior dislocation of the atlas observed by Swanberg, which was not diagnosed by the roetgenogram at first. He thinks the history of the case must be defective, as there is no account of traumatism other than the operation which was performed under local anesthesia, and the symptoms of dislocation did not appear until the night following. The soldier declined further manipulation or operation, and suspension under anesthetic gave only temporary increase of motility, and the roentgenogram showed no change afterward.

Tarsal Torsion in Weight Bearing. WILLIAM JACKSON MERRILL, *Journal of Orthopedic Surgery,* January, 1919.

The writer points out that static pains localized in various parts of the foot, have been relieved when torsion of the tarsus and antitarsus was employed. This emphasizes the action of torsion stress and its correction by producing reverse movements to the discursions in the various segments of the foot.

Empyema. A. E. Mozingo, *Journal American Medical Association,* December 21, 1918.

The surgical treatment of empyema by a closed method is described. The chief features of the method are summed up as follows: "1. A single early, minor operation without danger of shock or collapse of the lung. 2. Intermittent removal of secretion and antiseptic treatment given through a small rubber tube, wtih a bulb syringe. 3. Rapid partial sterilization with neutral solution of chlorinated soda (Dakin solution), followed by complete sterilization with a 2 per cent. dilution of liquor formaldehyd in glycerin. 4. Maintenance of negative pressure in the empyemic cavity, tending to early obliteration of the cavity. 5. One dressing which will last several days and no skin irritation. 6. Emphasis on simple physical principles rather than on major operative surgery." Details of the method are given at length and several cases are reported as treated by this closed method. A total of thirty-two cases were treated, twenty-six of whom, or 81 per cent., having completely recovered. A number of them were of long standing. The complications which have been observed included communication between the cavity and a bronchus which Mozingo thinks is more frequent than is generally supposed. One patient developed spontaneous pneumothorax, and a brief history of this case is given. A comparison is made with other methods, and the following advantages claimed: Absence of shock and collapse of lung, perfect evacuation and cleansing of the cavity and absorption of toxins, prevention of fixation of the lung by compression and more rapid sterilization. Dakin's solution followed by 2 per cent. dilution of liquor formaldehyd and glycerin is the ideal antiseptic, and communication with the bronchus is not a contradindication to its use. Constant negative pressure gives the maximum expansion of the lung, and the irritating and antiseptic action of the sodium hypochlorite solution causes rapid obliteration of the cavity. In uncomplicated empyema the patient need not be kept in bed. Test smears are negative when cultures are positive if Dakin's solution is used, and vice versa when formaldehyd-glycerin is employed. Roentgenographic and bacteriologic facilities, while always preferable, are not absolutely essential with the closed method, which is also attended with great economy of time, labor and dressings. It can effect cures in many cases similar to those originally treated by the Schede, Eastlander or Delorme operation. It is practicable at the home and in country practice. Hypochlorite solution of increased strength over Dakin's solution in both alkalinity and amount of vailable chlorin can be safely used in empyemic cavities, or Labarraquo's solution, diluted to the strength indicated, can be substituted for Dakin's solution. The closed method offers good chances of effecting cures in cases of double empyema through the possibility of treating cavities on both sides at the same time, which treatment is impossible by the open method.

Further Observations on the Radical Treatment of Peritonsillar Abscess. Clement F. Threissen, *Annals of Otology, Rhinology and Laryngology,* June, 1918.

Reports thirty-six cases of peritonsillar abscess in addition to forty-four reported in 1916 in which the abscess cavity was opened and drained by dissection backward toward the capsule with either partial or complete removal of the tonsil.

The operation can be performed in selected cases—where the surrounding edema is not so geat as to limit the opening of the mouth. Pus is present very early in the disease. Failure to find it is due to the incision not being deep enough toward the capsule. Theissen operates early, preferably during the first three days. The tonsil is dissected backward until pus is found. Then the portion of the tonsil that has been dissected free is removed. This technic was followed in the first twenty cases. In the later cases of the series reported (16) he followed Barnes' suggestion and removed the entire tonsil. He believes, with Barnes, that no untoward results follow. In his cases they were most gratifying. Local anesthesia—cocaine and adrenalin—was employed except in five cases—in children when the anesthetic was ethyl chlorid.

Surgery of Arteries. F. C. Herrick, *Journal American Medical Association*, December 28, 1918.

Herrick shows the disadvantages of introducing foreign bodies in the surgery of large arteries and aneurysms. Protocols of his experiments are given and a fuller report is promised for later publication. The summary and conclusions as to the work so far carried out is thus given: "1. Strips of rectus fascia with muscle attached of varying size up to three-fourths that of the aorta of dogs may be placed through a dog's aorta or carotid without causing permanent clot or thrombosis. In certain cases no clot at all is formed. 2. In over half the experiments, the contraction of the aortic walls about the inserts and of the inserts against the slits in the aorta entirely controlled hemorrhage. In the remaining cases, from one to four simple sutures controlled bleeding from the corners. 3. These inserts diminished the lumens of the aortas to approximately one-third to three-fourths their former volume. 4. Such inserts may be used to diminish the volume of a large artery, to diminish the orifice of a sacculated aneurysm, to favor thrombosis of the aneurysmal sac by being placed through it, or to limit the size of a fusiform aneurysm by being placed so as to exclude certain sectors from the current. 5. In no cases have symptoms of embolism been noted. The only pathologic observations to exclude such occurrence were: (a) In two cases examined at necropsy within six days, no clot was formed at all. (b) In four cases examined at necropsy later than six days, no clot was present. (c) In all cases but one, when a clot was formed it took a uniform, blunt tipped icicle shape, was quite firm, and would not easily break off. 6. A patch of fascia or muscle may be sutured to an arterial defect with perfect functional results. 7. The sac of an aneurysm or the vessel proximal to it may be lessened in volume by such inserts. 8. An arterial patch of muscle and fascia in a dog is consistent with perfect function of the artery."

Clinical Results in 200 Transfusions of Citrated Blood. R. Lewisohn, New York, *American Journal of Medical Sciences,* February, 1919.

Lewisohn believes that the method of adding an anticoagulin to the whole blood for purposes of transfusion has come to stay, and that thus far his citrate method has proven to be the most applicable. Lewisohn's analysis of the results attained in 200 cases proves its eminent usefulness. Chills do not occur any oftener by the citrate than by any other method of transfusion, and the reasons for the occurrence of these chills are not quite clear.

Anthrax Septicemia From Accidental Inoculation of Shaving Wound. R. W. Augennie, Rochester, *Boston Medical and Surgical Journal,* Feb. 6, 1919.

Augennie reports the case of a robust young man aged 24 who developed what appeared to be an ordinary furuncle of the left cheek. He told the story of having shaved himself that morning and of accidentally cutting himself. A new brush had been used. All the symptoms of a virulent anthrax developed and he died in four days. Augennie quotes the United States health report to the effect that anthrax of the face and neck after shaving has been noted increasingly often of late. It is assumed that this increased incidence is perhaps due to the letting down of the bars due to the war against raw materials employed in the manufacture of shaving brushes.

Superficial Epitheliomas of the Skin. L. W. Ketron, *The Journal of Cutaneous Diseases.* January, 1919.

Basal-cell epitheliomas may occur as superficial patches with little tendency to invade the deep layers of the corium. The only clinical sign which distinguished these is a raised pearly border; but this may be absent, and the differentiation is only possible on microscopical examination.

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THE IMPORTANCE OF BLOOD EXAMINATIONS IN THE SURGERY OF THE NOSE AND THROAT.

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The more than occasional reference in the literature to cases of severe or even fatal hemorrhage following operations upon the nose and throat and particularly operations for the removal of the lymphoid tissue of the nasopharynx and faucial tonsils attracts attention. The undoubted existence of a goodly number of fatalities which are unpublished and hidden away in the memories of the operator, leads to much thought as to why these procedures should be fraught with so many more complications of this nature than in other general surgical interventions. Is it due to a lack of pre-operative understanding of the individual, or to unusual abnormalities found with greater frequency in these regions?

Harmon Smith reported, in an article many years ago, a series of over fifty cases compiled from the literature of alarming hemorrhage after tonsillotomy. We must, however, take exception to his statement as to the careful attention drawn to this subject in the text books. We have been unable to find anything more than the crudest casual reference in the works we have consulted.

May we be so bold as to say that it is a lamentable fact that of all those in the medical profession who would dare to do any kind of a surgical operation, probably more have had the temerity to attempt operations upon the nose and throat with less knowledge of their anatomy, than upon any other part of the human body.

Why have so many men who likely would shrink from attempting even the most minor surgery, been emboldened to operate upon the tonsils? Surely, there must be a good reason and our object in calling attention to this state of affairs is not to deter any one from attempting surgical work he is capable of doing, but to emphasize the importance of preparation for the performance of operations that have long been regarded too lightly.

We find constant explanations in the published cases of abnormal position of blood vessels and other lame excuses, for upon a critical analysis of the case, in most instances, the resultant complication has been due to a lack of sufficient preliminary investigation of the patient to be operated or in some cases a very decided error in technic.

The haphazard calling of a patient a bleeder, as an explanation without warrantable fact, is as poor a diagnostic excuse as hysteria; they both cover a multitude of sins and have eased the conscience of a multitude of occasional surgeons and shielded the incapable or futile efforts of the more experienced.

There is an old adage, "He who lives in a glass house, must pull down the blinds" and we must plead guilty in earlier experiences to the very defects which we are pleading to correct. We have but to cite the following instances in the experience of one of us.

An opera singer had a lymphoid mass at the base of the tongue, which interfered with her high note vocalization. Her history was that five years previous, a very celebrated laryngologist had removed her tonsils, and for a period of nearly a week following, there was a constant succession of secondary hemorrhages, which finally ceased after a ligation of the carotid artery. This history was accepted with due consideration, but there had been nothing in my observation (non-surgical) of this patient which led me to any conclusion but that the bleeding had been due to anything other than poor surgical technic. I accordingly guillotined a mass from the base of her tongue. Four hours later a secondary hemorrhage took place and I spent the remaining thirty hours in attendance upon her. Can you imagine a more difficult place to control a hemorrhage in a nature of a steady ooze? Had I the knowledge of the value of blood examinations at that time, I would have determined in advance of the operation that which I subsequently ascertained, that this patient was a true hemophiliac.

It is not the purpose of this paper to take up the question of the type of operative procedure, but we must make reference to the universal diversity of the plan of attack. Each operator seems to have a particular pet method. For example: in recently observing six different men in the course of one afternoon operate at one of our prominent clinics, each operated by a different method, and while we grant that every road may lead to Rome, yet some have pitfalls and are headed straight for the cemetery.

Upon close inquiry, we found that of the large number of these cases, twenty-six, which we saw operated upon at that particular clinic, had either entered the hospital the previous night, or on the day of the operation and only a local examination of these children's noses and throats had been made. We are satisfied that some of these cases had had a very recent acute infection of the upper respiratory tract and probably were still running temperature or having considerable bronchial cough or a nasal secretion suggestive of an ethmoidal infection.

In one, the character of the nasal discharge with the excoriated condition of the muco-cutaneous juncture of the nose would to my mind have suggested a possible nasal diphtheria. In not a single instance was a blood examination made to determine whether or no a hemophiliac or purpuric tendency was present. Three of these manifested a sufficiently troublesome amount of bleeding to have suggested very strongly that such a dyscrasia was underlying, although in one case one could not help but reflect that the use of the bistoury was rather an antiquated method of operation and one attendant with the possibilities of inviting disaster.

The invariable practice of controlling the bleeding was by compression. Only one operator of this group resorted to the use of the haemostatic forceps. Many of these cases left the operating table oozing and in all probability subsequently vomited up large quantities of swallowed blood. Observations of this kind raise the thought as to why should throat surgeons perform procedures differently than the general surgeons. Would the abdominal surgeon rely upon compression and close the wound without securely ligating every bleeding surface? If not, why should throat surgery be performed along such indifferent and careless lines?

It is not, however, the object of these remarks to dwell upon this phase of the subject, but rather to take up some consideration of the subject of the blood under normal and hemorrhagic conditions and to make reference to the great importance and preoperative value of blood examinations preliminary to operative work upon these parts, for to be forewarned is to be forearmed, and the safeguarding of the patient is the safeguarding of our own reputation.

Under normal conditions, when blood escapes from the blood vessels either into the tissues or outside of the body, coagulation takes place in from three to ten minutes. If the blood were to be removed from one of the blood vessels without first coming into contact with the tissues it would require a longer time to become jellied throughout. The same blood that coagulates in between three and ten minutes, when removed directly from the blood vessels may require thirty to forty minutes for coagulation. Almost all of the methods suggested for the determination of coagulation time fail to recognize what physiologists demonstrated long ago, that contact with the tissues markedly accelerates the coagulation time of the blood.

After the coagulated blood has stood for a short time the fibrin in the clot contracts, holding in it the enmeshed blood cells, and a straw-colored fluid is expressed which is known as serum.

Numerous theories have been advanced concerning the reason for the coagulation of blood and the one of Howell is probably most generally accepted, because each step is supported by experimental evidence. We may briefly summarize as follows: The final product, fibrin, does not exist as such in the blood, but is formed from its precursor, fibrinogen, by the action of thrombin upon it. Thrombin is a protein substance. It does not exist in the circulating blood, but is formed by the inter-reaction of prothrombin and calcium salts. The activation of prothrombin does not occur normally while the blood is still in the blood vessels; it occurs only after the bleeding has taken place for the reason that in the blood there is a substance which prevents the formation of thrombin and has been called anti-thrombin. The blood platelets and blood cells, when they undergo disintegration, and the lacerated tissues produce a substance which neutralizes anti-thrombin and allows thrombin to be formed by the combination of calcium salts and prothrombin. "Thromboplastic substances" is the term given to those materials which nullify the action of anti-thrombin. Howell has isolated a phosphatid which he calls "kephalin," which substance has the power to counteract the action of anti-thrombin.

Many methods have been devised for the estimation of coagulation time. Some have involved the removing of blood from a vein; others with the obtaining of blood by puncturing the skin. The removal of blood directly from the vein necessarily must exclude the action of thromboplastic substances derived from lacerated tissues and the blood will not coagulate as quickly as the blood removed by puncturing the skin.

Of course, this method does not give us a fair index of the coagulability of the blood comparable with that which obtains after an operation. After a surgical procedure, the blood exudes over cut or lacerated tissues and gains the action of the thromboplastic substances from the cut or lacerated tissues in addition to the substances produced by the disintegration of the blood platelets and blood cells. We have adopted a method which is most serviceable in relation to nose and throat surgery. The skin is punctured with a needle having a knife edge and the blood is sucked into a 0.2c.c pipette, such as is used in serological work. The blood is then allowed to flow about the center of the pipette and it is then placed in the thermostat at 37° C., and observed every two minutes. From time to time a small drop of blood is blown on to a glass slide to determine whether coagulation has started. When coagulation is complete, it is very difficult to blow the blood from the pipette. Very often the blood, after having coagulated, does not contract and does not attach itself to the sides of the pipette and flows readily upon holding the pipette in an upright position. For this reason, it is always necessary to blow a drop on to a glass slide to determine the presence of a clot. By allowing the blood to flow to about the center of the pipette, we avoid as much as possible any action on the blood which may occur as the result of drying while in the thermostat. With this method the coagulation time was estimated in over 400 cases, the average time being 6.3 minutes; the most prolonged coagulation time was 29 minutes, and the shortest was 1½ minutes.

In connection with this work, it is always necessary to determine the bleeding time for the reasons that will be mentioned later. The bleeding time is determined by noting the time when the skin is pierced and observing how long it will bleed by gently squeezing the part from time to time. The bleeding time was determined in nearly 200 of the cases above cited; the average time was 5 minutes, the longest bleeding time 29 minutes and the shortest 2 minutes. The coagulation time may be prolonged and the bleeding time may be short, or vice versa, or both may be prolonged.

Two conditions, namely, hemophilia and purpura, demand especial attention in connection with this work, for if they are not recognized before an operation is performed, they may give rise to complicating conditions which may even jeopardize the patient's life.

In no case where either the bleeding time or coagulation time varied much beyond the limits of normality, was operation undertaken without preliminary preparation to improve the altered blood condition. If this was not successfully accomplished, as occurred in a few instances, a refusal to operate was emphatically made.

Hemophilia is a hereditary disease transmitted through the female to the male offspring. It is characterized by greatly increased coagulation time, and as the result of an individual receiving a slight wound, it may prove the cause of his death. The true etiology of hemophilia is not yet known. It was presumed, at one time, that the delayed coagulation time was due to an increased amount of anti-thrombin, but subsequent investigation has proven the falsity of this supposition. It was then thought that there was in the blood of these patients a smaller quantity of calcium salts than normally exists.

A series of several patients having a delayed coagulation time were prepared successfully for operation by the administration over a period of time of large doses of calcium lactate. In some of these cases the hereditary influence could be demonstrated. From time to time, cases of hemophilia calcipriva are found, but the great majority of them have apparently a normal amount of calcium salts. Thus far we have been unable to unravel the mystery.

Purpura is a condition in which the bleeding time is prolonged, and the coagulation time is normal, although the clot does not contract. There is a dimunition in the number of blood platelets, and the erythrocytes are easily laked by hypotonic salt solutions. Hess has recently shown that this dimunition in blood platelets is only apparent, but not real. There is a dimunition in the visible blood platelets and the remaining number are in solution in the plasma. This observer believes that purpura hemorrhagica is caused by some toxin which dissolves blood platelets and injures the blood vessel walls. The poison in some hemolytic diseases is thought to be associated with a disease of the spleen, as the number of blood platelets increases after the spleen has been removed, and it is suggested that splenectomy should be taken into consideration in the course of the treatment of such a disease.

Lee and Robertson have been unable to produce experimental purpura in guinea pigs by injecting the serum of a rabbit that had been given immunizing doses of guinea pigs' blood platelets. They found the identical conditions the same as observed in a patient suffering from purpura. We are at present repeating this experiment with the view of producing an anti-platelet serum and if possible applying it to human beings.

The purpuras constitute a great variety of cases differing only in details. Purpura is not a hereditary disease, although in exceptional instances several cases have been found in one family. In one of our cases now under observation, a child with a normal coagulation time and an intensely prolonged bleeding time, the blood platelets were markedly reduced, and it was found upon further investigation that a similar condition of delayed bleeding time and blood platelet reduction existed in the mother as well as the father.

In this case there is a probability of the cause being an impairment of the nutrition of the blood vessel as the result of the influence of heredity from a syphilitic parent. Calcium administration in this case was of no avail nor is this remedy expected to be of value in purpuric cases. Unless improvement follows the administration of human serum, this patient will not be subjected to operation.

A number of cases have been reported in which the coagulation time and the bleeding time are prolonged and there is a diminution of blood platelets. These cases are very rare, and seem to be a combination of the two diseases.

In anaphylactic conditions the coagulation time is prolonged and very often the bleeding time also prolonged. We have been confronted with this problem in several cases suffering from anaphylaxis due to asthma or pollinosis where there existed in addition a disease which required operative interference.

R. W., a young woman with a markedly delayed coagulation time, suffered from asthma due to horse dander. This was successfully treated by immunization methods. In addition there was a complicative ethmoiditis. An unusual degree of secondary oozing for five days took place after the local nasal operation.

It has also been observed that the children of individuals who have an anaphylaxis, who themselves show no symptoms of a disease such as asthma or pollinosis, manifest, however, a decided alteration in the blood coagulability, the same as the parent.

Hemorrhage may be divided, from the therapeutic standpoint, into two classes: continuous, slow oozing of blood and active bleeding from a severed or lacerated blood vessel. It should not be a great problem to effectually check the latter variety even though its site may be difficult of access. The treatment of the former condition depends upon a great many factors. In the bleeding due to hemophilia, the purpuras, leukemia, anaphylaxis or any other condition in which the coagulation of the blood is prolonged, or is there a disturbance in the nutrition of the lining of the blood vessels, or is there some subtle toxin which produces a destruction of the blood platelets, or destroys the red blood cells, or is there a combination of one or more of these factors?

Therapy.—Human blood serum, or in the absence of that, diphtheria antitoxin may be administered either subcutaneously or intravenously. We have given transfusions of whole blood with exceptionally good results in several cases. Of course, in the cases of hemophilia or purpura, the effect of these treatments is only temporary, inasmuch as it checks only the momentary tendency to bleed or the hemorrhage after operation; it does not cure the primary condition. Many substances have been used which has been found effectual in checking the slow, continuous oozing which has occurred, whether spontaneously or following operation.

Among these we may mention Coagulen, which consists of blood platelets of the horse; Thrombokinase, made from the pig's lung, and Thromboplastin, which is macerated brain tissue suspended in saline solution. This last preparation was originated by Hess, and has for its object the counteraction of the anti-thrombin in the blood; it is efficacious in stopping capillary oozing of moderate severity.

Lowenberg and Rubenstone have recently conducted an experimental research on the effect of glycerinized extracts of visceral tissues on the coagulation time of the blood.

They found that the normal tissue extracts uniformly accelerate the coagulation time of the calcium plasma, and that most of the hemophilic tissues, with the exception of thyroid and liver, seem to exert almost the same influence on coagulation. Thyroid gland and liver not only caused a prolonged coagulation time, amounting to two and one-half times the corresponding normal tissues, but actually inhibited the action of the calcium added to the plasma, so that the coagulation of the calcium plasma was prolonged almost two minutes.

These observations were repeated with uniform results, and though admittedly limited to the tissues of one hemophiliac, yet they are strikingly significant, in that there is possible that the thyroid and the liver may secrete an anti-thrombic substance or enzyme which may be in part, if not principally, the cause of the deranged coagulative mechanism of hemophilic blood.

There are various other biological products which are more or less efficacious, but they are too numerous to mention and bear very little relation to the ultimate object of this paper. Calcium salts have been found to be occasionally successful in reducing the coagulation time in those cases in which it is prolonged. When the coagulation time is normal, calcium salts have no effect. This was demonstrated in a series of fifty children having normal coagulation time, who were fed with calcium lactate with no influence.

One of the most difficult condition to combat is when the bleeding time is prolonged. We have no means at present of absolutely counteracting the substance in the blood which destroys the blood platelets, lessens the resistance of the blood cells or causes a disturbance in the nutrition of the lining of the blood vessel. Occasionally, however, the bleeding time may be shortened by the administration of large doses of human serum as the following cases among a series demontrates.

A brother and sister were advised to have their tonsils and adenoids removed. In the girl the bleeding and coagulation time was over fifteen minutes, and in the case of the boy, the bleeding time was eight minutes and the coagulation time fifteen minutes.

Unfortunately at the time, owing to war conditions, we were unable to procure brilliant cresyl blue, which is used in counting blood platelets, and this phase of the case was necessarily neglected. The proposition which presented itself was, therefore, one in which the bleeding time and coagulation time were inordinately prolonged, and the other in which the bleeding time was within the range of normal but the coagulation time was prolonged. Both children were given calcium lactate in large doses over a period of a number of days without appreciable effect. Ten c.c. of the serum obtained from the father's blood was injected intramuscularly into each of the children. One day later, the coagulation and bleeding times of the girl were found to be twelve minutes and sixteen minutes, respectively, and in the case of the boy, nine and ten minutes, respectively. It was decided to remove the tonsils and adenoids of the boy. He bled considerably during the operation, but not sufficiently to be disturbing. Five days after the first serum injection the girl was again given ten c.c. of her father's blood serum. The bleeding and coagulation time two days later was found to be seventeen and nine minutes, respectively. Because the bleeding time still remained prolonged it was decided to defer the operation. Four months later the girl was again tested and her bleeding time was found to be fifteen minutes and the coagulation time twelve and one-half minutes. Again ten c.c. of her father's blood was injected intramuscularly, and two days later the coagulation time was seven minutes and the bleeding time six. Tonsillectomy was then performed without any undue bleeding taking place.

In conclusion, let us say that these observations are recorded for the purpose of showing the importance of a little more care before performing operations without sufficient preliminary examinations, and of stimulating further investigation along similar lines, hoping to localize the offending principle causing these idiopathic diseases.

THE DECLINE OF TYPHOID FEVER

It is of great interest to note the remarkable decline in the total average typhoid rate that has occurred in the large cities of this country since 1910. Whatever be the statistical objections in regard to accepting the figures on their face value, it can hardly be questioned that a very great improvement has taken place in the typhoid situation in this country since the publication of these annual summaries was first begun. The 1917 typhoid death rate in a population of approximately 25,000,000 will bear comparison with the rate in a similar population anywhere in the world. The health officials of American cities deserve great credit for this improvement which has, to a large extent, freed sanitary science in this country from the reproach of excessively high city typhoid.—*The Journal of the American Medical Association.*

SOME CONCLUSIONS CONCERNING APPENDICITIS COMPLICATING PREGNANCY.

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A review of the French, English and German literature on the subject of appendicitis complicating pregnancy, supplemented by my personal clinical experience, justifies the following conclusions:

1. Appendicitis occurs at all ages and in both sexes. Its pregnancy is underestimated and its significance is not fully appreciated. It presents to all medical men important diagnostic, prognostic and therapeutic features.

2. Appendicitis, acute or chronic, initial, relapsing or recurrent, primary or secondary, complicates pregnancy with greater frequency than is believed. It is often overlooked or misdiagnosed and therefore improperly treated. It is the most important complication of pregnancy.

3. It occurs in single and twin gestations; in first, early and late pregnancies; in primipara, deutipara and multipara.

4. It occurs at all periods of the child-bearing age and at all periods of gestation. It complicates both intra- and extra-uterine pregnancies and can co-exist with other disease processes to which it may be primary, secondary or coincidental.

5. Gestation exerts no untoward influence upon the normal appendix. It can and frequently does aggravate existing, or determine new inflammatory disturbances in appendices deviating from the normal in form, length, mobility, location, etc., in appendices, the seat of inflammatory or other degenerative changes or bound down by adhesions, or containing foreign bodies.

6. Appendicitis and unilateral or bilateral tubal pregnancy are frequently mistaken for each other. They may occur simultaneously or consecutively, may be either primary or secondary to, or independent of each other. Appendicitis may hasten tubal abortion through local infection, through general intoxication, may lead to suppuration of hematoceles, of fetal cysts.

7. In appendicitis, in ectopic pregnancy, and in combined appendicitis and ectopic pregnancy, of obscure symptomatology, it matters not whether you are certain or in doubt as to the real diagnosis, early and timely operative treatment is imperatively indicated. Some cases of appendicitis in which extra-uterine pregnancy was thought to co-exist proved to be cases of appendicitis complicating uterine pregnancy.

8. During gestation, every type of appendicitis may occur; adhesive, catarrhal, gangrenous, ulcerative, obliterative, perforative and suppurative. Pus may be present within the cavity of the appendix, in its wall or around it. An appendiceal or peri-appendiceal abscess may rupture spontaneously into the uterus, vagina, rectum, through the abdominal wall and into the peritoneal cavity.

9. Appendicitis with adhesion formation is of great significance because adhesions of inflammatory origin can: (a) incarcerate the pregnant uterus in the pelvis and mechanically hinder the enlargement of the uterus; (b) impair the contractibility of the uterus; (c) interfere with uterine labor contractions; (d) entail subinvolution; (e) induce sterility; (f) disturb tubal and ovarian integrity of function and of structure; (g) determine ileus; (h) produce abortion, and (i) lead to extra-uterine pregnancy.

10. Infection can and does spread from the appendix to the genital organs by way: (1) of the peritoneum (localized or diffuse peritonitis); (2) of the appendiculo-ovarian ligament; (3) of adhesions existing between the uterus and a perityphitic pus focus; (4) of the Fallopian tube.

11. Simultaneous, consecutive or coincidental inflammatory or other degenerative processes of the uterus, tubes, or other pelvic organs may co-exist with appendicitis. The close anatomical relations existing between the appendix and the pelvic organs explain their frequent association in disease processes. It is easy to understand how inflammation can migrate from the appendix to the Fallopian tube, to the pregnant uterus, etc.

12. Appendicitis has a greater morbidity and a higher mortality in the pregnant than in the non-pregnant, operated or non-operated.

13. Appendicitis may or may not terminate pregnancy. The prognosis is good as to non-interruption of pregnancy: (1) when the appendix does not hang in the small pelvis; (2) when the inflammation is limited to the appendiceal mucosa; (3) when it does not extend beyond the appendiceal wall; (4) when the appendiceal abscess or peri-appendiceal abscess is small.

14. Pregnancy is a serious complication of appendicitis: (1) when the appendix is adherent to the uterus; (2) when it is the seat of an inflammation perforative, gangrenous or suppurative in type; (3) when its inflammation leads to abscess formation, near or distal; (4) when the uterus forms part of the wall of an appendicular, peri- or para-appendicular abscess. In the aforementioned con-

ditions, adhesions may be torn and the abscess may be ruptured by the enlarging uterus.

15. The symptomatology of appendicitis in the pregnant is the same as in the non-pregnant. The clinical picture, however, is blurred by the co-existing symptoms of pregnancy. Mistakes are less likely to occur by keeping in mind that: (a) Every pregnant woman is to be examined for physical defects; (b) the history is all important; ask about previous attacks. In cases of relapsing appendicitis in young women, the attacks frequently occur just before or at the menstrual period; (c) in gravid women, all attacks of indigestion associated with vomiting and fever should arouse suspicion and command careful examination of the abdomen; (d) right-sided iliac pain unassociated with uterine contractions should lead one to think of appendicitis; (e) deep-seated retro-cecal and other abscesses may be detected by rectal examination; (f) Peri- or para-typhlitic abscesses may be detected by vaginal examination. Pregnancy increases the severity and the mortality of appendicitis.

16. The morbidity and mortality of appendicitis complicating pregnancy and the puerperium are the morbidity and mortality of delay in applying efficient surgical treatment. The initial symptoms of the attack do not enable the clinician to foretell accurately how a given case will terminate. What is going to happen in ten, twenty, or forty hours following the onset of appendicitis cannot be foreseen. When the condition is diagnosed and remedied early, the mortality is practically nil. Abscess formation may be forestalled by early diagnosis and early operation. The high mortality is due to late diagnosis and late operation. The pregnant woman whose metabolism is good is a good subject for operative measures.

17. The type and the acuity of the inflammation influence the prognosis. The prognosis is good if the changes in the appendix are slight; if the inflammation is limited to the appendiceal wall; if there be slight or no peritoneal involvement; if complications be absent. It is grave in gangrenous, perforative, and suppurative appendicitis and in all cases complicated by abscess formation near or distal, or by diffuse peritonitis.

18. Prognosis is better for the mother if there be no interruption of pregnancy, spontaneous or otherwise. The bad attacks cause abortions and abortion aggravates the illness. In the great majority of surgically treated cases, there is no interruption of pregnancy and when it does occur it is not due directly to the operation. The interruption of pregnancy is not indicated. It aggravates the prognosis.

19. The results for the mother and fetus are better, the less advanced the gestation, the less virulent and wide-spread the inflammation, the earlier the operation.

20. As far as the child is concerned, prognosis is absolutely good in cases of early operated appendicitis. Severe maternal appendicitis is exceptionally grave for the fetus, who succumbs either through infection or through interruption of pregnancy.

21. The following prophylactic measures are sound and safe and are recommended for general adoption: (a) During the child-bearing age, recurrent attacks of pelvic pain, dysmenorrhea, menstrual and other pelvic disturbances unassociated with objective pelvic findings are not infrequently due to unrecognized appendicitis or sequelae thereof. In the presence of this etiological factor, the ablation of the appendix is indicated. (b) In laparotomies for conditions other than appendicitis, the appendix should be examined. Should it present any deviation from the normal, its removal is indicated. (c) During the child-bearing age, any woman who has had one or more attacks of appendicitis treated non-operatively should have her appendix removed so as to correct existing pathological conditions and prevent future attacks of appendicitis and complications thereto. True prophylaxis in a woman of child-bearing age who has had one or more well marked attacks of appendicitis is an interval operation. It goes without saying that constipation is to be avoided and that other hygienic precautions are to be observed. A definite and accurate diagnosis of acute, chronic or recurrent appendicitis invariably calls for operation, irrespective of the stage of pregnancy. The disease, during pregnancy, runs such a rapid destructive course that delay is hazardous. Operation should be early and immediate. A case may be rendered hopeless by hesitation and inaction. Temporizing methods are extremely dangerous.

22. Treat appendicitis in the pregnant female as you treat it in the non-pregnant. Every pregnant woman who is a subject of appendicitis should be operated on just as soon as the diagnosis is made, whether the attack is the first, second or third.

The unusual risks of leaving a diseased appendix in the abdominal cavity are much increased by the pregnant state and the evil consequences of another attack, *i. e.*, gangrene or perforation, will be correspondingly greater. The danger of recurrence in the later months of pregnancy and in the child-bed calls for operation, preferably during the attack. If the patient is not seen in time, one will do the next best thing, an interval operation during the pregnancy. Pregnancy is an additional indication for operation in cases of appendicitis.

23. In inflammatory disease of the appendix, the ideal operation is appendectomy. In some cases, however, one has to be content with incision, evacuation and drainage of an appendiceal abscess. Exceptionally, drainage of abscesses in Douglas' pouch may be affected through the vagina or rectum. Pus should be evacuated, irrespective of uterine contents and irrespective of its location.

24. It is well to keep in mind that for an appendectomy the median incision is contra-indicated in the later months of pregnancy, that it is best to avoid or to reduce to a minimum the manipulations of the uterus; opiates are indicated in the after treatment. Labor when it occurs shortly after a laparotomy is not to be unduly prolonged; it may have to be assisted. When operating for appendicitis in a pregnant woman, every effort should be put forth to prevent miscarriage. Interruption of pregnancy is not indicated as it increases the danger.

25. In all laparotomies for conditions other than appendicitis, if the patient's condition permits, the appendix should be examined and removed: (1) If it be abnormal in length, size or location. (2) If it be in close relation to a pedicle or denuded surface, left by operation. (3) If its cavity be partly or wholly obliterated. (4) If it be the seat of anatomic alterations, club-shaped, thickened, kinked, twisted, strictured, etc. (5) If it contain foreign bodies, fecal concretions, worms, etc. (6) If it be adherent, in part or in its entirety, to some normal or diseased contiguous organ or to the abdominal parietes. (7) If it be the sole content or one of the contents of a hernial sac. (8) If it be the seat of cystic, neoplastic or inflammatory disease

26. When in doubt as to whether the case is one of appendicitis, salpingitis, tubal pregnancy or other pathological conditions, use a supra-pubic median incision. This incision affords easy access to most of the pelvic contents and though it is not the incision of election for exposure of the appendix, it is a very serviceable incision.

Oases.

The country is really going dry. Still there seems to be hope for the alcoholically thirsty. So long as one of the large mail-order houses in the country continues to sell *Vinum Carnis et Ferri, N. F.,* in gallon jugs the drought may not be as noticeable as it might be otherwise. Seriously, however, isn't it about time for the professions of medicine and pharmacy to heave into the discard such utterly unscientific combinations as "Beef, Wine and Iron?"—*Journal American Medical Association.*

THE EXPERIENCES OF A RHINO-LARYNGO-OTOLOGIST WITH THE AMERICAN EXPEDITIONARY FORCES.*

Harold Hays, M.D., F.A.C.S.,
Associate Editor, American Journal of Surgery—
Major, M. C., U. S. Army. (Discharged.)
New York City.

At the suggestion of your Chairman, Dr. Robert Lewis, I am going to relate to you my personal experiences abroad, particularly dwelling on my impressions of the way the nose, throat and ear work was handled. Fortunately or unfortunately, as one may look at it, I spent very little of my time in special work, but of course I was brought in contact with others who devoted all their time to it. Whatever I have to say here in criticism, or otherwise, is not "official," as we say in the Army. At present there are few accurate statistics, particularly those relating to nose, throat and ear diseases.

WITH THE BRITISH ARMY.

On October 3, 1917, I sailed for France, with a detachment that was ordered to report to the Presbyterian Hospital Unit (Base Hospital No. 2). I knew that Gerhard Cocks was doing the special work there, but I thought he was probably a very much over-worked man and no doubt needed someone to help him out. In our detachment were eight medical officers, thirty-one nurses and forty-seven enlisted men. After a very pleasant voyage, we landed in France on October 22nd, and reported to the hospital that same evening. The hospital was comfortably located in a small summer resort on the Normandy coast, called Etretat, about seventeen miles from Havre.

Much as I would like to go into a description of the place and the various activities there, such matter is hardly relevant to this paper. One of the first things I found out was that the unit had not expected the new officers and didn't need us, and they particularly didn't need me, as Cocks was attending to all our special work very well, besides qualifying as a Sanitary officer. However, I was willing to serve in any capacity, so the following morning I found myself digging out a lot of ingrown toe-nails, dressing leg ulcers, and being initiated into the mysteries of P.U.O.—a disease that no one knows anything about, and cares less. However, there was another well-known specialist, Dr. Henry S. Dunning, who is noted for his work in oral surgery, doing the same thing, and of course there were various other medical misfits who were training themselves to become specialists in general medicine and surgery. Cocks was kind enough to let me look into a throat or ear once in a while, so that I wouldn't forget what they looked like, and I think I was fortunate enough to assist him in a mastoid operation.

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*Prepared for the Eastern Section of the Society of Otology, Rhinology and Laryngology, Feb. 15, 1919. Because of lack of time, this paper was not read.

I kept at this general work for about a month. I amputated a toe, made numerous physical examinations, spotted an empyema, dressed innumerable inconsequential wounds, and attempted to make myself generally useful. Apparently Col. Geo. E. Brewer, who, at that time, was head of the unit, thought my services so valuable that he asked me how I would like to go up to the front with a British Field Ambulance. And almost before I could answer him, I received my orders, and Lts. Cook and Morgan and I began our journey toward an Unknown Land.

For four months I hiked around in the triangle between Cambrai, Amiens and St. Quentin, and had the usual exciting and varied experiences that front line life yields. It was almost necessary for me to forget that I was a specialist. My one desire was to impress the British with the fact that I was a soldier and up there to learn anything that I could to help the good work along. I learned well to love and admire the British officer and soldier, who are as fine types of men as one would wish to see. I admit that it is difficult to become acquainted with an Englishman, for he is diffident, almost bashful, but once you have his friendship, you have it for life.

I had joined the 110th Field Ambulance of the 36th Division, an Irish organization that was noted for its humor, cheerfulness, and fighting qualities. Some of the officers were Irish, others English, and there was one canny Scotchman. The high degree of medical knowledge among them impressed me immensely. They not only knew military medicine, but civil medicine, and more than favorably compared with our own men.

Of course, I was always on the look-out for nose, throat and ear cases. There were very few of them until it became noised about that I was a specialist. Then everything in that line was referred to me. But the few instruments in the ambulance were hopeless. There was some peculiar right-angled speculum which boasted of a magnifier in front, but it was impossible to see anything through it. There was a cumbersome applicator and an antiquated nasal speculum. I made up my mind that if I were to do anything worth while, I would have to have some proper instruments, and so I requested Mayer & Meltzer, of London, to send me a good mirror, a few applicators, an aural currette, a laryngeal mirror, aural and nasal specula. By the aid of a candle in a half-darkened room, I was sometimes able to see something.

To my mind it seemed that an aural specialist should have been attached to each division, and I think something like that was attempted in the American Army. There was hardly a day that some nose, throat or ear case did not come up that needed an expert opinion. Such a specialist could have traveled from one field ambulance to another, and could have been kept busy. He is needed for one of the following good reasons:

(1) To diagnose serious throat conditions, such as syphilis, diphtheria, Vincent's angina, tonsillitis, etc.
(2) To sort out the malingerers who state that they have recently been gassed.
(3) To correctly diagnose sinus disease.
(4) To diagnose ear diseases, more particularly acute otitis media, and deafness arising from acute concussion of the drums.

Among the throat conditions seen, probably the most important from our standpoint was tonsillitis. In the severe winter of 1917-1918, it was only natural that we should see an enormous number of throat infections of a mild character that would hardly incapacitate a man from work at home, but which made him unfit as a soldier. These cases of nasopharyngitis or laryngitis were usually treated with a dose of salts and some chlorate of potash tablets. Once in a while the throat could be swabbed with a silver nitrate solution, if the medicine or an applicator could be found. As a rule, the soldier was placed on light duty or off duty for one day, never being sent to a hospital unless he had a temperature. There were certain cases of laryngitis which demanded better treatment, but one seldom had the time to treat the case properly, nor was the surgeon willing to evacuate the man for such a mild complaint. Vincent's angina came next in importance. Of course we had no means of making an accurate diagnosis of this disease. However, as there was seldom any diphtheria around and as syphilitic cases presented other symptoms, one usually made the diagnosis by exclusion.

By far the most interesting cases from the laryngological point of view were the gas cases. You probably recollect that, after the glorious work of the British Army on the night of the 21-22 of November, 1917, and the following ten days, the Germans took it into their heads to launch a counter-offensive, which not only undid the work of the previous days, but came perilously near demoralizing that part of the British Army. I don't believe I have ever seen such chaos as there was on the Bapaume-Cambrai road. On the 2d of December I was ordered to a Main Dressing Station at Fins, which was a few kilometres from the line. My associate, Capt. Crosbie, and I were detailed to take care of all gas cases. There were sometimes hundreds in a day. The men did not look very seriously ill, but the harsh, dry cough racked their bodies until they were sore. Very little treatment was administered to them, but they were given warm clothes, plenty of hot tea and always a cigarette, which some of them, even with their cough, would try to smoke, although the majority would stick the cigarette behind dirty mud-caked ears to await a more favorable opportunity for a smoke. All of these men were given a hot bath and new clothes in order to get rid of as much of the gas as possible. Later on I had a chance to observe gas cases more carefully.

When gas had been thrown over in large quantities, there was a great possibility for the malingerer to come into his own. It was the easiest thing in the world to simulate the symptoms and, moreover, there were a good many men who inhaled the gas after it had become so weakened that it had become almost harmless, but who were genuinely afraid of serious later symptoms. The malingerer would come into the Dressing Station with a woebegone look on his face, would answer questions in a harsh whisper and bark as hard as anyone. That he had no smell of gas round him meant nothing. I have no doubt that a goodly percentage of the cases that came to us were faked, but we had no time to differentiate, and we always thought it wisest to give the man the benefit of the doubt. The worst cases of gas poisoning I saw were in men who had lain behind tanks for some hours and had inhaled the fumes of the exhaust. They were knocked out completely and needed immediate restorative treatment. Almost all these cases were evacuated to a Casualty Clearing Station and eventually reached a Base Hospital.

Men seldom came in to complain of nasal conditions unless acute pain was present. We saw a certain number of sinus cases which were evident from the symptoms. If we were lodged in one place long enough to establish a hospital, we would open up our kits and get out some adrenalin and compound tincture of benzoin.

The ear cases seen at the front may be divided into three classes: first, the cases of acute otitis media, which were surprisingly few in spite of the weather and the number of men who were suffering from pharyngeal conditions due to the dampness, mud, the continuous exposure and the innumerable cigarettes they smoked. In the four months I was at the front, I do not recall ever having had to incise a drum. I saw one case of acute mastoiditis, which was sent to the rear.. Quite a number of cases of what we term acute catarrhal otitis media were seen, but I am inclined to believe the causative factor was different. I do not believe that these conditions arose secondarily to a nose and throat infection, but were probably caused by the continuous heavy vibrations of the drums from the fire of artillery of large calibre nearby. Many of these cases would clear up by themselves.

My personal experience is interesting. I was sent up the line on the morning of the second day of the battle of Cambrai, and was immediately placed in a Walking Wounded Station about three kilometres behind the line. You can imagine the terrific din. Not a moment of the day or night was still. The continuous cannonading, particularly with sixteen-inch shells from a naval battery close by our dug-out, was deafening. I could feel my ear drums vibrate, and after forty-eight hours there was a continual aching in my ears, and I was practically stone deaf. I was in no position to do anything; moreover, I was too busy and incidentally too anxious to play the game. In the course of the next few days all symptoms disappeared and I have never suffered since, although I was continuously within the sound of heavy guns. I imagine that many of the men met with a similar experience. Whether they will suffer in the future is another matter.

The second class of cases are those of chronic suppurative otitis media of which I saw quite a number both at the front and at the base. You must remember that by 1917 England used any and every man she could lay her hands on—that is every man who could carry a seventy-pound pack on his back. Such a thing as a discharging ear was too trifling to mention. There were any number of ears with foul discharges, hundreds of them with polypi, some of which were large enough to be seen without a speculum. Little could be done for these men at the front and the worst of it was that the men knew that they would invariably be sent back to the Base for treatment. One might ask why they were not operated upon when they reached there.

At times a polyp would be removed—that is, if the man gave his consent. Unfortunately, the British Army has no such wise regulation as we have, that if the medical officer says an operation is necessary, the operation is done. In our Army we consider that the efficiency of the Army comes first, and that if a Medical Officer suggests an operation, it is because he considers that it will make the soldier more efficient. Now just see how it works out in the British Army. The man with a discharging ear goes back to the Base Hospital for treatment. He is acute enough to know that if he has an operation and survives, the chances are that he won't be able to come back from the front when he likes. So he takes a few weeks' rest in the hospital, submits to a certain treatment which does him no permanent good, refuses operation, and then goes back to the front. As long as his battalion is on a 'cushy' job and in little danger, he remains. Then the order comes to go over the top. Does he go? Mr. Tommy knows what's what. He reports at sick call before a new M. O., who has never seen his ear before. The Medical Officer sees a polyp and orders him to be evacuated, and so he goes back for another well-earned rest. Tommy, no doubt, has been doing the same thing for two or three years, and he is determined to do it until the war ends.

We now come to the cases of chronic progressive deafness, or chronic catarrhal deafness. In the hurry and bustle of the front line, it is almost impossible to pick out these cases, but every once in a while a man is brought in to the ambulance who has had deafness of long standing. He is usually a man who shows no outward defects, and who attempts to do his duty. We all know of the sensitiveness of the deaf person. That sensitiveness follows him to the front line. I recall one instance of a man who was almost stone deaf. He knew he was deaf before he joined the Army, but he read lips very well, and so no one thought to examine his hearing. His sergeant reported that the man was stupid. At drill, where he had to keep his eyes front, he was always getting his squad in trouble, of course, because he couldn't hear the commands. He was brought to the hospital because of his stupidity. Fortunately, he got into my hands, and naturally the first thing I did was to examine his hearing, and roughly test his ears. The man was hopelessly deaf and confessed his previous condition to me. I took the matter up with the A. D. M. S. (Assistant Director of Medical Services, or Division Surgeon), and he was finally evacuated for reclassification or probably discharge. A second case came to my notice up in the trenches in front of St. Quentin, where I was temporarily serving with a batallian called the Second Irish Rifles. A man was brought into me who had been on guard in the front line for three days. He misinterpreted an order and when he was reprimanded, a suspicion flashed through his captain's mind that the man could not hear very well. So the captain brought him down to me, and I discovered the true state of affairs. There were tears in the man's eyes when I told him he had to go back. "I'm all right, Captain," he said. "I been up here three years and there ain't no one who found out I was deaf afore. Won't you let me stay?" It was only when I convinced him that he might sometime endanger his companions that I got him to feeling better.

Many people have asked me for figures relating to the number of cases of deafness I thought would result from the war. Up to the present time there are no figures available in any of the armies, and it is a question whether we shall ever get any figures that are at all accurate. I have no doubt that many men have had permanent injuries to their eardrums, which will not become apparent until sometime after the war is over. I was particularly anxious to have a special hospital established to take care of all men who complained of deafness so that we could get at them in the early stages. I took up the matter with the New York League for the Hard of Hearing, but apparently in the press of more important Army matters it was not possible to get the work under way. During the period of reconstruction we shall, no doubt, have occasion to meet with many cases of deafness, but they will be the hopeless ones for which little can be done. It would be worth while for this Society to take up this matter and I would suggest that a committee be appointed with such men as Col. McKernon and Col. Richardson upon it. This committee could keep in touch with the Surgeon General's Office and also with members of the Society, who could report cases that came to their notice of soldiers who found they were suffering from deafness after they had gone back to civilian life.

(To be continued)

He that murders a pound destroys all that it might have produced, even scores of pounds.—Buy War Savings Stamps.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, APRIL, 1919.

THEORIES OF SHOCK.

The causation of shock has always been one of the favorite problems of surgeons and physiologists. Like Belgium, its field has been the "battle ground" of experimental investigation. The battles have been numerous, long, and strenuously waged. The line has surged back and forth with amazing rapidity and its field is torn by the shells of exploded theories. It is unnecessary to pursue this simile further, except to say that the field is still practically unconquered, and that we must expect the battles to wage for many years to come. No peace conference can ever settle the problem of shock.

In the meantime the practical outsider stands bewildered. Every year or so he is asked to accept a certain "theory" of shock and to practice a corresponding "rational" therapeusis. But the long suffering practical man has become accustomed to the policy of "watchful waiting." He knows that within a short time the new theory is proven wrong and he is again just where he was before. Indeed, the sum total of accepted facts in regard to shock is pitifully small, and even some of these rest on slender support.

Those who were interested in shock felt that the vast concentration of material brought about by the wounds of war would substitute light for darkness: and when in August, 1917, the Medical Research Committee of Great Britain appointed a special investigating committee to correlate laboratory and clinical investigations, hopes were aroused to the highest pitch. The reports have already been published (Journal American Medical Association, Feb. 23 and March 2, 1918) and while they reveal interesting data, the reported results leave our hopes rudely disappointed. Nothing of fundamental importance was brought out.

We were aroused to these animadversions by reading the refreshing and rather pungent critique of some of the more recent theories of shock by Meltzer (Pennsylvania Medical Journal December, 1918). First of all, he tackles the acapnia theory of Yandell Henderson. Henderson believed that shock is due to a diminution of carbon dioxid in the blood, and that therefore the proper method of treatment must consist in attempting to increase the quantity of carbon dioxid in the blood by rebreathing the expired air. This theory receives short shrift in Meltzer's hands, and it is enough to say that Hendersons' theory has been in McLeod's words, "dignified by an apparently adequate burial."

For many years surgeons and physiologists, have known that the blood pressure is low in shock. This is one of the few accepted facts in our knowledge of shock. But the manner in which this low blood pressure is brought about is perhaps the most disputed point among investigators. For many decades, physiologists believed that this low blood pressure was accompanied by a relaxation of the peripheral blood vessels which leads to the accumulaton of blood in the splanchnic area. In recent years, the opinion has gained ascendancy that the peripheral vessels are contracted. A correct explanation of this sudden shifting of the blood volume would clarify the problem enormously. Upon the assumption that the blood is caught in the splanchnic area, Cannon some years ago suggested that an intraperitoneal injection of pituitrin would be an advisable method of treating shock. The trouble with this theory is simple; it isn't true; as surgeons who have opened the abdomen while the patient is in a state of shock can amply testify. Cannon thereupon abandoned his theory, and while visiting England and France during the war, he became converted to the acidosis theory. In this theory, Cannon assumes that there is a loss in alkali reserve due to lowering of blood pressure, consequent upon the hemorrhage and toxemia. The lowering of the alkali reserve roughly corresponds to the drop in pressure. He therefore recommends the intravenous injection of bicarbonate of soda, and acting on Bayliss' suggestion, the injection is made with a solution of acacia so that it is not too rapidly excreted. This theory is of too recent a date to bear extension criticism, but Meltzer states that the acidosis theory is losing ground, and that even Bayliss himself has given up the idea that acidosis is of primary importance in shock. More likely it is an accompanying condition and not a cause.

Finally, Meltzer handles without gloves the recently promulgated theory of Porter, that shock is most frequently due to fat embolism. Meltzer's main criticism of Porter centers around the fact that Porter is no clinician. He shows that none of Porter's reported cases reveal any of the well recognized and readily demonstrable signs of fat embolism. Aside from this, Meltzer shows that the therapy of Porter based upon his theory, namely the inhalation of carbon dioxid to increase respiratory movements and thus force the fat out of the pulmonary veins, is not based on sound physiological principles.

It is a hazardous thing to venture any opinion in this maze of conflicting testimony, but we have always felt that one of the reasons for this enormous divergence in view is the fact that the term "shock" is a rather vague disorder and probably comprises a number of different concepts, all of which have similar clinical signs and symptoms. We believe, for instance that "shock" and that state of constitution brought about by extensive hemorrhage are too entirely different or perhaps accompanying disorders, and that the condition known as "collapse," that often follows shock, is probably another, due largely to nerve exhaustion. Finally in all our readings concerning shock we miss what to our minds is the most important element in the causation of shock, namely, the psychic element. We base this belief not only upon our own clinical experiences but also upon the very significant observation that a state of "shock" comparable to that seen in man, is extremely difficult to obtain in animals. To our minds, therefore, shock is a profound state of anxiety neurosis. Crile, in his investigations of the effect of fear upon the bodily constitution, has to our view, enunciated a principle of far reaching import.

E. M.

WELCOME HOME

The demobilization of the Army is being attended with a more or less rapid return to civilian practice of the medical officers who forsook their lives of civilian service in order to participate, as was their privilege, in the splendid work of safeguarding the health of the Army, and of reclaiming those suffering the injuries of warfare.

We are certain that our subscribers will pardon a personal note of pleasure at the return from foreign service of our Editor-in-Chief, Walter M. Brickner, Late Major of the United States Medical Corps, whose services in connection with Base Hospital Number Three require no word of praise from those who know him and who appreciate his enthusiasm, devotion and ability. His return is welcomed, and his renewed activity in connection with the American Journal of Surgery will reflect the benefits which have accrued to him because of his close contact with the serious business of war surgery.

No man could have passed through the experiences following a big "show" without having seared upon his conscience a deeper realization of the innate spirit of manhood, and a greater thoughtfulness as to the worth of human life. A broadened knowledge of surgical technic, sanitation, and administration possess undoubted practical advantages, but none is attended with the full depth of feeling that is consequent upon daily attendance among those whose shattered frames attest their willingness to suffer in behalf of fundamental principles bringing no personal reward. To have gone through a maelstrom unscathed is a matter of congratulation, though only the result of chance. To have lived amidst the furies of war unleashed, and to have returned with a sense of greater rejoicing at the splendid character of men; to have dwelt on a plane of service for an ideal, to have toiled assiduously for a common cause,—these are the real essential factors of personal elevation which have transformed our citizen doctors with experience in military service into a nobler type of men, who see visions that could not have been dreamed without the spiritual bath of blood.

In hailing and greeting our returned Editor-in-Chief we extend the hand of good fellowship and warm comradeship to all our colleagues who are now returning to our shores and also to those whose arms are graced with the silver chevrons of willing service. May their days and years of application in civilian pursuits bring the rich reward of work well done, and the consciousness of a continued loyalty to mankind, and a heightened interest in the public weal. May their achievements and their efforts reflect a part of the glory and satisfaction that has come to them in their national service. May they find abundant opportunity for the normal expression of those elements of character upon which depended their success and accomplishment while wearers of the national uniform. May the national color that they have taken on be daily manifest in their relations to the men, women, and children who comprise the Nation, in behalf of whom they have served as faithful, earnest, and long-suffering, patient exponents of the divine art of healing.—I. S. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

Attacking Venereal Diseases in the Army.

The efforts being made by the War Department, through the office of the Surgeon General, to secure control of venereal diseases, merit the highest commendation. The dissemination of knowledge, the issuance of directions, the stimulation to activity have borne undoubted fruit.

The attempt to combat venereal diseases is dependent upon four particular items in the Surgeon General's program, according to the *Review of War Surgery and Medicine*, February, 1919. By the use of social measures to diminish sexual temptations, the education of soldiers and civilians in regard to venereal diseases, prophylactic measures against venereal diseases, and medical care there has been a marked decrease of wastage of time, money, and manpower because of preventable venereal diseases.

Some of the statistical data authorized for the information of the Medical Department is of considerable significance. During the 53 weeks ending September 27, 1918, there was 178,204 venereal disease cases reported under treatment in the United States Army of this country. To the credit of the Army be it said that approximately 85 per cent. had entered the Army already infected, and only about 15 per cent. of those reported were contracted after enlistment. During the 53 weeks there had been a loss of over 2,067,000 days, which is the equivalent of the complete loss of service of 5,663 men for an entire year from venereal diseases.

The benefits to military effectiveness which have resulted from the introduction of prophylactic measures, systematic inspections, and preventive measures are evidenced in the decrease in the annual venereal disease rate from 155 per thousand in 1910 to 83.6 per thousand in 1915. Incidentally, it may be suggested that the cases thus reduced were practically of new infections, as previous to the recent war men infected with venereal diseases were refused admission to the Regular Army. Even more meritorious are the results obtained since the institution of the Surgeon General's program, as evidenced by a dropping in the rate of new infections from 83.60 per thousand in 1915 to approximately 20 per thousand in 1918. In the American Expeditionary Forces, the annual venereal disease rate has varied from 20 to 40 per thousand, principally traceable to the licensed French houses of prostitution, which finally have been placed as far as possible out of bounds to the United States troops.

The prophylaxis applied at the early treatment stations has demonstrated its value. Of 23,702 men taking the prophylactic treatment for a period of 22 weeks only one per cent. developed a venereal disease, despite the fact that many of them failed to apply for many hours after exposure.

General Orders Number 17, (1912) provide that "all men who do not take prophylaxis after exposing themselves to venereal infections shall be courtmartialed for neglect of duty." The potential force of this order is difficult to estimate, but it undoubtedly served as a partial coercive measure to secure the thoughtful attention of men to the venereal disease problem, and to the necessity of taking advantage of prophylactic treatment.

It cannot be gainsaid that the attitude of the military authorities regarding venereal diseases has been responsible for a marked improvement in the morbidity rate from these enervating diseases which so seriously interfere with military effectiveness. The institution of the program so successfully applied under military regime would probably secure a similar result in civilian life. The fact, however, that there is no posibility of direct punitive measures through courtmartial decreases the effective force of any program designed to apply to civilian population. Law enforcement, quarantine, the treatment of prostitutes and infected males will aid in the reduction of disease carriers even though it will not necessarily lessen the demand for sex indulgence.

The institution of a widespread program under the auspices of the United States Public Health Service will assist materially in arousing public opinion and in insuring a more adequate plan for dealing systematically with the venereal disease problem under civilian conditions. The experience of the military forces gives reason for a greater degree of optimism with reference to decreasing the rate of incidence of venereal diseases. Self-discipline and self-control, as stimulated by the military authorities, may be transplanted in part into civilian fields, and will bear advantageous results.

In connection with any measures of administration designed to attack the venereal disease problem, great attention must be given to the establishment of prophylactic measures, venereal disease clinics, an adequate number of beds for the treatment of those infected, detention wards for disease carriers, and a rigid enforcement of laws and regulations dealing with communicable and contagious diseases. Hospitals and dispensaries will necessarily undergo numerous changes with a view to perfecting their organization for the care and management of venereal diseases to supplement the efforts that are to be made under the auspices of State and Municipal Health Departments.

One of the greatest accomplishments that is a derivative of military necessity is the awakened realization of the enormity of the venereal disease problem, and the keener understanding of the rational measures essential for its control. The single greatest endemic affliction is now being attacked throughout the country. It is to be hoped that the end results will be commensurate with the increasing efforts at regulation and control.

Book Reviews

The Doctor in War. Woods Hutchinson, M.D. With illustrations. Boston and New York: Houghton Mifflin Company, The Riverside Press, Cambridge, 1918. Pp. 481. Price, $2.50.

With a wide experience after traveling through the war zone, the author has been enabled to present an interesting volume concerning the medical phases of the recent war. Written with the usual grace and literary style characteristic of its author, it tends at times to be exuberant in praise where conservatism in judgment might be more desirable. There is a tendency towards finality in conclusions regarding various methods which is not thoroughly justified by experiences as related in the current technical literature of war medicine.

As a whole, the triumph of medicine has received a sympathetic consideration, and behind a desire to establish a readable and pleasant book there is heaped up an interesting mass of details and facts reflecting credit upon the attempts of medical forces to save in the midst of destruction, to construct and to reconstruct the manhood threatened by the perils of the forces of war that raged on the land and in the air. In every way, however, there has been accomplished a splendid exposition of accomplishments through intelligent attention to details in the various directions necessary for safeguarding health and advancing the physical welfare of fighting forces.

Practical Diatetics. With Reference to Diet in Health and Disease. Alida Frances Pattee, Graduate, Department of Household Arts, State Normal School, Framingham, Mass. Late Instructor in Dietetics, Bellevue Hospital, New York City. Former Instructor at Mount Sinai, Hahnemann, and the Flower Hospital Training Schools for Nurses, New York City; Lakeside, St. Mary's, Trinity, and Wisconsin Training Schools for Nurses, Milwaukee, Wis.; St. Joseph's Hospital, Chicago, Ill.; St. Vincent de Paul Hospital, Brockville, Ontario, Canada. *Twelfth Edition.* Revised and enlarged. Price $2.00. A. F. Pattee, publisher, Mount Vernon, New York, 1918.

The Twelfth Edition of this excellent work has corrected the minor defects which had been noted in the previous edition. In its present form it is a most valuable book, embodying sufficient information on the principles of nutrition and food preparation to satisfy the demand for theoretical instruction. The second part of the book, devoted to the practical application of the principles of nutrition, is eminently useful. Part three, devoted to hospital dietaries, the diet in disease and diet in special conditions, continues to be an up-to-date compendium of present dietetic tendencies in the management of various ailments by those most capable of directing the nutrition of the sick.

The book deserves the highest commendation and its sphere of influence represents a thoroughgoing, practical, and sane presentation of modern dietetics.

Autotherapy. Charles H. Duncan, M.D., Discoverer and Founder of Autotherapy. Former Mechanical Engineer of the Illinois Steel Company. Co-Founder of the Volunteer Hospital. Attending Surgeon and Genito-Urinary Specialist Volunteer Hospital, New York City, 1905-1914. Honorary Member Veterinary Medical Association, New York City. Published by Dr. Charles H. Duncan, 2616 Broadway, New York City.

The kernal of truth which may exist in autotherapy is so thoroughly covered by verbiage that it is difficult to determine how much faith should be placed in this therapeutic measure. The book as presented contains numerous reports of cases and a surfeit of endorsements, which, however, are not adequately checked up by a series of control experiments.

The criticisms that the author levels at the medical profession directly and by implication might well be applied to the author, who "is speaking from personal grounds." To suggest that professional objection to a new procedure is based upon its prevention of operation, is scarcely rational in these days of careful judgment as the basis of operative procedure.

The theory of autotherapy, in a nutshell, consists of the administration of pus from various lesions by mouth, or by the injection subcutaneously of soluble toxins derived from scrapings of wounds or from secretions. The general rule for autotherapy, as laid down by the author, is: "When the pathogenic exudate or the end product (or a dilution of the same) of any localized, loosely localized, and possibly non-localized infectious disease is with a Berkfeld filter and the filtrate injected hypodermically, or placed in healthy tissues remote from the infected area, antibodies specifically corresponding to all of the microorganisms in the locus of infection will tend to be developed."

The method of writing is that ordinarily utilized by disgruntled egotists, whose attempts at scientific exposition are tinctured with a meglomania of fanaticism. There may be some basis, scientific or otherwise, in autotherapy, but calm reason and a rational questioning promptly indicate that it is not a panacea, nor could it be the universal therapeutic measure as assumed by iits explosive sponsor and father.

Mental Diseases. A Handbook Dealing with Diagnosis and Classification. Walter Vose Gulick, M.D., Assistant Superintendent Western State Hospital, Fort Steilacoom, Washington. Illustrated. St. Louis. C. V. Mosby Company, 1918. 139 pages. Price $2.00.

A brief and concise presentation of the classification of mental diseases as accepted by the War Department and a well-digested and orderly arrangement in discussing the various psychoses and neuroses. The brevity of the book is at the same time a commendable feature, though naturally, a markedly limiting factor in presenting the subject. As the author states in his preface, however, the short chapters merely "undertake a statement as to the data essential in the recognition of the different psychoses."

Progress in Surgery

A Résumé of Recent Literature.

Peanut Bronchitis. E. J. Patterson, Pittsburgh, *New York Medical Journal*, Jan. 15, 1918.

Patterson reports six cases, all of them occuring in young children, in which lung signs developed shortly after a history of their previously having eaten peanuts. The signs and symptoms varied widely in the different cases, varying from those of a moderate embarrassment of respiration to those of a consolidation and abscess. The *x*-ray proved of help in nearly all the cases, the picture showing sometimes the presence of a non-opaque body or the presence of consolidation. The foreign bodies were viewed in each instance with the bronchoscope. In two instances, tracheotomy was necessary after the bronchoscopy. One patient died.

Secondary Sutures in Wounds. A. L. P. Piollet, *New York Medical Journal*, Jan. 25, 1919.

Piollet described the methods that have been so successfully practiced by French surgeons during the past year or more. If the patient is seen in the first 12 to 18 hours, all dead tissues, foreign bodies, etc., are excised: the excision comprises all the tissues and is neatly done; the wound is then completely sutured. When the conditions are not entirely favorable, especially if the wound already shows evidences of infection. Excision may be practiced after completely sterilizing the wound as far as possible. In this group of cases, the Carrel-Dakin method is eminently applicable. Piollet says that suture of wounds is possible even if the wound is not absolutely sterile; for instance, a few staphylococci or pyocyaneus bacilli will not delay primary union; but no wound should be sutured that harbors staphylococci or the bacillus of Welch. Poillet describes the technic of excision and suture. The main principles consist of an unusually rigid asepsis and suture of each individual layer in turn; suture of the aponeurosis of the muscles especially is important. Drainage is not employed except in large wounds and then a few horsehair threads at either angle are employed. After treatment consists in alleviation of pain and complete immobilization. The wound is not dressed until the fourth day.

Infected Gun-shot Injuries of the Hip. Leo Mayer, *American Journal of Orthopedic Surgery*, January, 1919.

Mayer details the experiences with five cases and comes to the conclusion that exarticulation at the hip is productive of much shock and is dangerous. Excisions are less shocking and yield a satisfactory result. It is immaterial whether an ankylosis or pseudoarthrois results; a good weight bearing joint is desirable. Any motion is of advantage.

Irritable Bladder in Women. C. A. L. Reed, *Journal American Medical Association*, February 1, 1919.

Reed describes irritable bladder in women as being a condition in which severe pain in urinating and frequent desire to urinate make life miserable for the patient, and trying to the physician. The underlying condition is abnormal sensibility of the lining of the bladder itself, which may be caused by conditions either external or internal. Those working from the outside usually act by pressure, such as in cases of pregnancy, uterine displacements or tumors. Among the conditions arising within the bladder and that have a causative bearing on the symptoms acute infection, generally gonorrheal, tuberculous infection, local growths, benign or malignant; calculi; diverticula, etc., may be named. In a certain proportion of cases, circumscribed ulceration, the so-called Fenwick ulcer, near the outlet has been found the essential condition. Another form of ulcer is specially mentioned, which might be designated as the Hunner ulcer, first described by Dr. H. L. Hunner; or, better, as the punctuate ulcer of the bladder, as being more descriptive. Importance of differential diagnosis in these cases from early thorough examination is emphasized, and three cases are reported. The symptoms are those of the irritable bladder first mentioned, and the urinalysis findings are usually negative. Reed reproduces the description given by Hunner as he has found it most accurate and helpful. He calls attention to a glazed dead white appearance of a portion of the bladder nucosa as seen through the cystoscope. Sometimes there are small congested areas in the immediate neighborhood of this, which sometimes ooze blood and are often surrounded by an area of edema. In certain of these cases, Reed has observed a granular appearance suggestive of tuberculosis, but which we now know, from Hunner's research, is due to the development of minute cysts with mucous lining. The diagnosis of punctuate ulcer is based on the history of the case, the existing symptoms and the urinalysis and cystoscopic findings. The causes have not yet been fully determined, but the possibility of focal infection is admitted, though longer observation is required. The pathology, so far as developed, seems to be that of a chronic interstitial nephritis, more or less involving the bladder wall. The treatment seems to be reduced to surgery, the complete excision of the ulcer-bearing area. The original method, devised by Hunner, was extraperitoneal, and was employed in the first of Reed's cases, while his other two were treated by a transperitoneal operation.

A Study of Pulmonary and Pleural Annular Radiographic Shadows, Together With Notes on Interlobar Fissures. Sampson, H. L., Heise, F. H., and Brown, Lawrason, *American Review of Tuberculosis*, 1919, Vol. 2, No. 11.

With a wealth of illustrations to support their thesis, Sampson, Heise and Brown of the Trudeau Sanatorium publish a noteworthy article on "silent" or unrecognizable cavities in the lungs that are detected by *x*-ray. The The authors prove rather conclusively that many of these cavities are not intrapulmonary, but are interpleural and situated between the lobes of the lungs or between the lungs and the chest wall. In other words they are likely to be interlobar pneumothoraces or hydropneumothroaces, or localized pneumothorax. Annular shadows, cast upon the *x*-ray plate, in a large part of these pathological formations, were noted 50 times in 423 consecutive cases admitted to the Trudeau Sanitorium. This would be 11.8 per cent. of admissions. The authors conclude that these annular shadows occur in patients more likely to be suffering from pulmonary softening, and that they indicate rupture of the lung. Because of adhesions only partial pneumothorax, with or without fluid, results. The pneumothorax usually occurs in the upper part of the greater oblique fissure and in the horizontal fissure on the right. It can rarely be diagnosed clinically and indicates a somewhat graver prognosis.

Fracture of Vertebrae. L. F. Luckie, *Journal American Medical Association*, February 1, 1919.

Luckie reports a case of fracture of cervical vertebrae due to an aviation accident. The patient had consulted a number of physicians and surgeons without obtaining relief, but was practically cured by the use of a device which, Luckie says, literally hung the patient from his own shoulders, and was the only method used besides massage. The disability, which was due to the grinding of the bones together, showed itself in boring headaches and pains in the arms and stiffness of the muscles, rendering the patient discouraged and almost hopeless of cure. The value of the appliance was that immobilization was obtained, and the vertebrae held apart from each other, thus allowing new cells to grow and recalcification to take place. Another important advantage was that the apparatus was so made that the patient was not confined to his bed and did not have to change or remove it whether waking or sleeping. The article is illustrated, showing the apparatus and the condition of the patient before and after treatment. He was able to return to duty as a military aviator.

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[American Journal of Anesthesia and Analgesia]

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April, 1919

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COTTON PROCESS ETHER AND ETHER ANALGESIA.*

JAMES H. COTTON, M.A., M.D.
TORONTO, CANADA.

Only a few years ago it was customary for the anesthetist to classify an ether as good or bad, according to its irritative properties. These were roughly estimated by the annoyance caused the anesthetist by the hypersecretion of mucous and little attention was paid to the amount of ether used or the concentration of its vapor. If a patient did not respond as rapidly as expected to etherization, he was considered an alcoholic or to be otherwise immune to its effects. Some few anesthetists realized that *too closed methods* of administration (Clover inhaler) produced the excessive secretion of mucous, while others improved their results by making the concentration of their ether vapor as uniform and low as was consistent with good, surgical anesthesia.

To establish a clear line of research a series of analyses and administrations were undertaken to determine the actual role of the irritative properties of ether impurities. These were divided into (a) *anterior nasal,* due to alcohol or acetones; or (b) *nasopharyngeal,* due to aldehydes. *Smells,* for the most part, were found to be due to the sulphur group.

It was found that the actual irritation value of any ether of standard aldehyde percentage to the mucous membrane, varied inversely with the anesthetic power of the said ether, and directly with the immunity of the patient to ether anesthesia. This presupposed that (1) patients varied; as also do (2) the anesthetic powers of different cans of ether.

In proof of the first contention a large amount of ether was mixed and administered to different groups of patients. Five cases of a known alcoholic type were compared with five cases, of a similar weight, but of a type which had not indulged. These patients were from 30 to 35 years of age. The alcoholics required from 25 to 75 per cent. more ether than did the non-alcoholics. Although the variation is not exact, the age and weights propositions were considered as having already been sufficiently proved.

In discussing the variation in anesthetic potency of different cans of ether, an unlimited field of research is entered, that leads back to the startling suggestion of a year ago that: *"absolute ether is not an anesthetic at all."*

ANESTHESIA.

Before proceeding further it is necessary to come to an agreement concerning the state commonly considered as anesthesia. Personally, *I consider anesthesia as analgesia—blocking of sensory impulses from the periphery, plus narcosis—or sleep.*

When a patient shows a type of breathing, a certain amount of muscular relaxation and contracted central pupil, is he actually surgically anesthetized? For years anesthetists and surgeons have recognized ether anestheisa by a series of such symptoms, and have neglected the fact that patients carried to this stage may still suffer from severe shock, and instead of being anesthetized are in reality only narcotized.

Interpreting each nervous system by the symptoms which customarily arise from it, what results obtain when a pure nerve poison acts upon the nervous system complex? Some well recognized facts are: (1) that a nerve poison acting on any nervous system first stimulates, then depresses, then kills; (2) that the more specialized a nervous system, the more sensitive it will be and the more easily it is stimulated, depressed and killed; and (3) that the order of specialization of the various nervous systems are:

Most specialized:
- Special Senses,
- Central Nervous System,
- Sympathetic Nervous System.
- Autonomic Nervous System,
- Spinal Cord.

Least Specialized:

Now all these stages and symptoms of nerve cell poisoning are those of anesthesia as quoted in the text-books, but not of real anesthesia since they do not in any way fulfill the requirements for the blocking of sensory nerve impulses, and the very basis of the teaching of anesthesia, apparently has been incorrect. Anesthetists and surgeons have been safeguarding the toxicity of ether and neglecting the shock of operation under narcosis, as nerve cell poisoning is simply an additive factor to operative shock.

ANESTHETIC POWER AND VARIATIONS FOUND IN MARKETED ANESTHETIC ETHERS.

Three years ago statistics affecting 150 abdominal cases operated under anesthesia by a certain brand of ether were compared with the results in another 150 similar cases, anesthetized with another make of ether. With one ether, after induction, from 4

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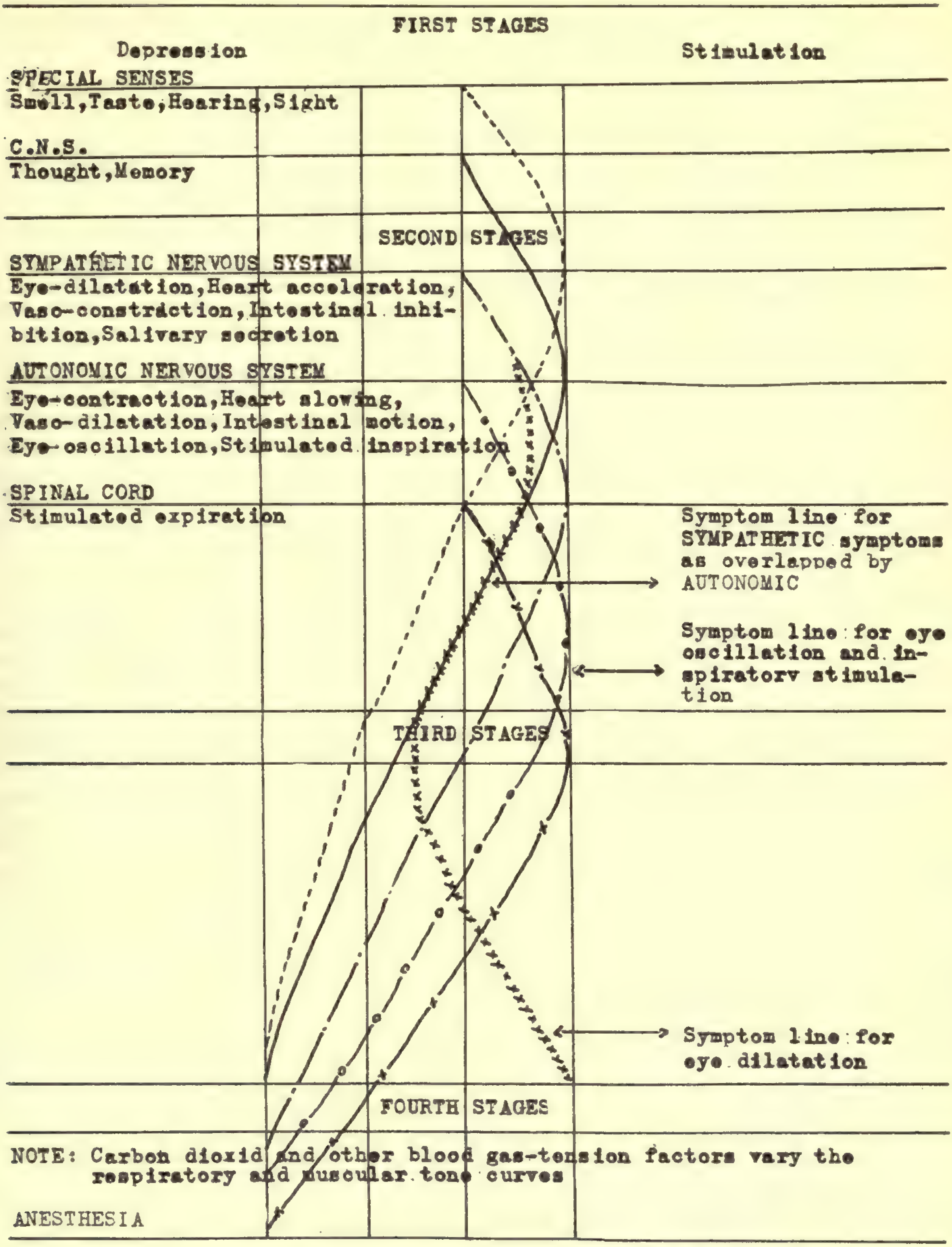
*Read during the Joint Session of the Interstate Association of Anesthetists and Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., September 25-27, 1918.



SYMPTOMS OF POISONING OF VARIOUS NERVOUS SYSTEMS

to 8 ounces were required per hour of maintenance; with the other ether from 6 to 12 ounces. From the aldehyde research it had appeared likely, but this was the first actual record that anesthetic ethers could vary in potency. It was found that the more potent ether contained traces of gases as well as more alcohol. Clinical trial of the weaker ether, in some ten cases. by increasing the alcoholic content, while it lowered the freezing point of exhaled moisture, preventing mask frosting and retaining ether and ether products on the mask longer, did not vary its anesthetic potency. It was, therefore, reasonable to suppose that some factor, other than alcohol, varied the anesthetic potency of an ether.

Research was then undertaken to obtain absolute ether from the commercial ethers already on the market. At that time these ethers were in a far more impure state than they are now, as the fusel oil groups were always detectable. After one and one-half years of hard study and work, a sufficiently chemically pure ether was obtained to warrant its clinical trial on patients.

This ether was so mild in odor that it could have formed the basis for any perfume. To the surprise and chagrin of all concerned, on administration, it was found not to be a good anesthetic. Dr. Samuel Johnston, a noted Toronto anesthetist, used 15 ounces on a middle-aged patient, who was congested to blueness without mucous secretion and without the production of proper anesthesia. There was a severe struggling stage; while muscular rigidity and sensory reflexes persisted and could not be suppressed. A few drops of Squibbs ether were then administered and the patient sank into a quiet anesthesia without sensory reflex. Very little more Squibbs ether was required during the whole of that operation. Excessive after-sickness resulted. Dr. Perfect, who was the surgeon, also vouches for these facts. This same ether, *when perfectly fresh,* was used on nine other cases,—all dental. Although symptoms of nerve poisoning resulted, no real anesthesia was produced in any one case, although from 9 to 14 ounces had to be given before the patients were stupid enough for extractions. Instead of sensation being obtunded it frequently became hyperesthetic. Persistent muscular tremor and peripheral congestion occurred in each instance. On going under patients complained of *feeling perfectly awful* and postanesthetic nausea and vomiting usually resulted. The pulse-rate rose very high during induction.

This same ether was then given to three cats for experimental purposes. Each cat was carried to the point of suspended respiration and then resuscitated. At no time were the muscles relaxed and although the cats were completely narcotized, the leg would twitch on being pricked with a pin. The recovery on resuscitation was almost immediate. After being supposedly killed three times, an apparent anesthetic condition could be obtained, but this was probably due to exhaustion. A few months ago this experiment was repeated in detail before a number of interested witnesses at one of the experimental stations of the DuPont Chemical Works, but since then similar results have not been found by these chemists.

From the above data it was concluded that absolute ether was not a good anesthetic and that real anesthesia could not be obtained unless it contained some potent synergist as yet unknown.

The first cooperative thought of was carbon dioxid. It was found that the peripheral spasm and muscular tremor following the administration of from 6 to 8 ounces of absolute ether, could be completely relieved by a small amount of carbon dioxid. As described in a previous paper, this *carbon dioxid-absolute ether anesthesia* is a type of its own. In a demonstration given at the Academy of Medicine, Toronto, I compared the action of absolute ether with that of nitrous oxid, in which the carbon dioxid tension factor is also a necessity. The anesthesia produced by this carbon dioxid-ether method is very similar to that obtained from nitrous oxid and the recovery is almost as rapid. In practice, it was found convenient to administer the carbon dioxid in a solution with ether in a metal syphon-soda arrangement with a controller similar to that used on the glass ethyl chlorid tubes.

Over 20 operations of a major as well as many cases of a minor type were performed under carbon dioxid-ether anesthesia with excellent results. There was no real after-nausea in any one case. The amount of ether averaged about 5 ounces an hour. The only objection to the anesthesia was the excessive stimulation of respiratory effort. The color and pulse were good and no case showed mucous. The patient on whom the method was demonstrated at the Academy of Medicine, Toronto, joined the physicians in attendance, and had coffee with them within three minutes after his extraction operation.

While clinical experiments continued in the operating room, ether research progressed in the laboratories, as there was not considered to be enough carbon dioxid in most commercial ethers to act as the potential factor in anesthesia. *It was then discovered that this absolute ether on being passed through a certain process, developed wonderful anesthetic powers.* Its analgesic properties were such that almost major operations could be performed with the patient still able to articulate clearly, without pain and not at all sleepy. More concentrated administration produced beautiful, quiet, sleep anesthesia, without shock. After a certain length of time, however, this product would deteriorate to an unusable degree, although the analgesic power increased in more than equal proportions. A few breaths, although fairly irritating, would produce almost completely obtunded sensation for some hours. Six cases were tried, including myself and friends, and we began to wonder if we were ever going to completely recover our feelings. We were otherwise normal, except for a slight sluggishness of memory.

Careful concentration and extraction of gases from this product demonstrated the presence of certain ethylenes and their by-products. As these were not present in the absolute ether base, they must have developed in the process.

Ethylene gas was then made by text book methods and added to absolute ether. It transformed absolute ether into a moderately good anesthetic, but the results were not comparable with those previously obtained; in fact such ether was by no means as good as Squibbs'. However, with careful synthesizing and research, anesthetic synergists of exceedingly high value and potency were finally obtained.

The product, now recognized by the medical profession as Cotton-Process Ether, is simply ether, purified to an almost absolute stage by the methods originated, plus these synergists. As these synergists were for the most part of a gaseous nature it was considered desirable to retain them in the ether in greater quantities than would remain at ordinary atmospheric pressure. With this end in view the ether has been kept in sealed glass ampules of about 1 ounce capacity, the idea being to administer it direct from such containers.

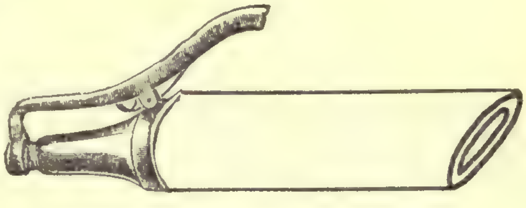
PECULIARITIES OF COTTON-PROCESS ETHER FOR ANESTHESIA.

Although this ether was primarily developed for analgesia only, a number of anesthetists and surgeons have used it and have reported it satisfactory for anesthesia.

Method 1—Administration from Drop Bottle on Open Mask. This method, though apparently successful, should never be used, as ether gases of great anesthetic value are allowed to escape. By this method the anesthetic power is about that customarily obtained from any good commercial ether, the after-effects being possibly less.

Case 1. Patient, female; age 28; weight 160 lbs.; operation for intestinal adhesions; induction gas-ether; time 4 to 6 minutes; time of operation 1 hour. Amount of ether used 8 ounces by volume on open mask. Condidition during operation: absolute relaxation; no mucous; color and pulse normal.

Method 2—Administration Direct from Ampule on Open Mask. The glass tip of the ampule is broken off and the end of the ampule is inserted into the rubber socket of a device similar to the automatic cut-offs of ethyl chlorid tubes. The gas pressure in the ampule is sufficient to expel the ether when the cut-off is opened and the ether is dropped or sprayed on the mask as with ethyl chlorid.



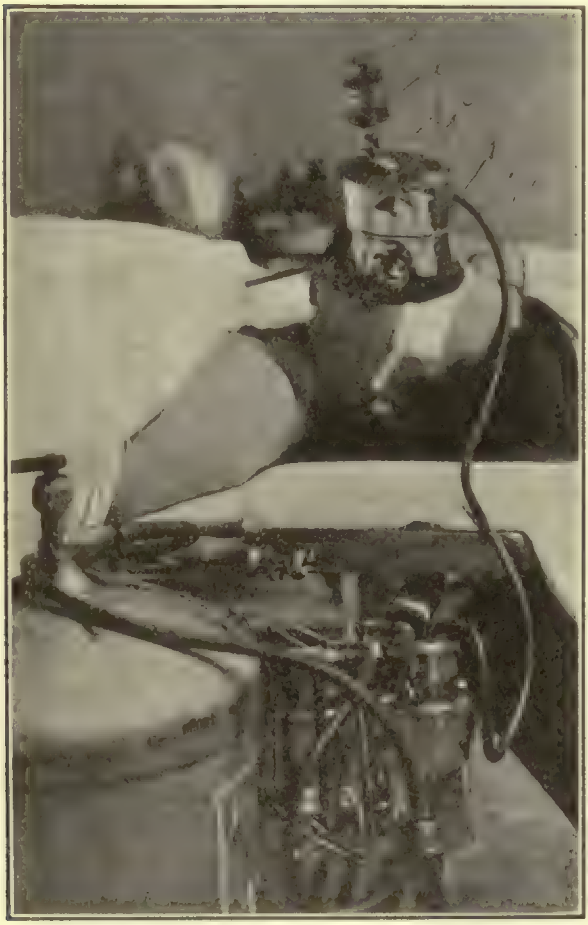
DEVICE FOR ATTACHING TO ETHER AMPULE.

Case 1. Patient, female; age 41; weight 104 lbs.; pulse 120; operation thyroidectomy. Previous medication ⅛ gr. morphin and 1/200 gr. atropin 20 minutes before anesthesia. Administration: pulse immediately after induction was 110. During the operation it dropped to 100, then to 80. On recovery it registered 108. Time of induction 3 minutes; time of operation 1 hour. Patient recovered sufficiently to speak in 20 minutes. Was somewhat drowsy for several hours. Amount of ether used 5 ounces. No after nausea. Surgeons: Drs. Perfect and Harrison.

Case 2. Patient, Mrs. C.; age 70; weight 112 lbs.; operation, breast amputation. Administration: time of induction 6 minutes; operation 1 hour. Amount of ether used 5.5 ounces. No after nausea and patient recovered before reaching room. Stated she had enjoyed going under. Surgeons: Drs. Hay and Wesley.

Method 3—Oxygen Semi-Closed. A. Gwathmey Apparatus. The value of this method was first drawn to the author's attention by Dr. J. F. Baldwin of Grant Hospital, Columbus, O., who was the first surgeon to use highly charged ether in any moderate series of major cases. The technic is one of Dr. R. A. Rice's "Perfected Methods of Anesthesia" (described in the American Year-Book of Anesthesia & Analgesia, 1915-1916) in which oxygen, from a low pressure tank, is led through the Gwathmey three-bottle, dosimetric vapor apparatus, with its ascending and descending percentage control, and the saturated oxygen-ether vapor, washed and moistened in the warm water bottle, is conducted by means of a rubber tube to a closely fitting face mask, or oral air-way, to which is attached a rebreathing bag. Baldwin reported 20 abdominal operations carried out, from start to finish, with this apparatus and method of anesthesia. The amount of ether used averaged from 1 to 3 ounces. The recovery was more rapid and the after-effects less than those occurring with ordinary ether. With this ether and method it was possible to induce anesthesia by the vapor method, whereas, previously, with other tinned ether, ethyl chlorid was always used for induction and almost double the amount of ether was found necessary for maintenance.

B—Modified Vapor Apparatus. This apparatus was designed to provide a vapor device with a large ether container, providing area sufficient for surface evaporation, thus obviating the undesirable feature of carrying over ether particles, as they are bound to be when the oxygen is passed through the ether. The ether is placed in the container (E) through a tap in the top of the container, all ether gasses being thereby retained. Oxygen is admitted from a low pressure tank into (D) a soft rubber bag at the rate of about 10 litres an hour. With the mask fitted tightly over the patient's face, tap (A) is opened, permitting the breathing of oxygen, then tap (B) is slowly opened, allowing part of the oxygen to carry over ether vapor. As more ether is required tap (A) is closed down. Excess rebreathing, causing dysphonia, may be rectified by emptying bag (D). The whole apparatus is hung on the oxygen tank.

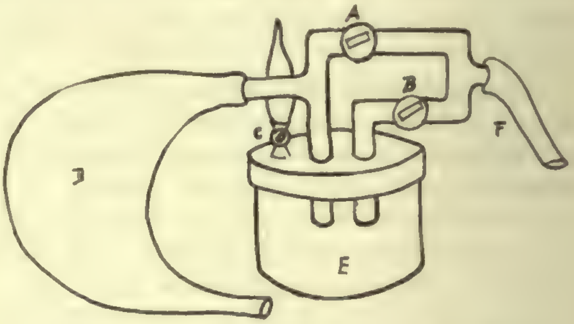


RICE PERFECTED METHOD FOR VAPOR ETHERIZATION.

This method is positively fool-proof for Cotton Process ether and will maintain the patients uniformly at any required depth of anesthesia. With it the new ether shows over double the anesthetic potency of tinned ether and recovery is almost instantaneous.

C—Perfected Apparatus. This is described under the consideration of analgesia and was developed to provide a simple, portable device, especially available for war purposes.

Case 1. Patient, Nurse; age 28; weight 125 lbs.; operation removal of tonsils. Administration: author's special apparatus. Time for induction 4 minutes; complete surgical anesthesia apparently obtained. Time for removing first tonsil 2 minutes; patient then completely awake but without feeling. She carried on conversation for 3 minutes when mask was reapplied; anesthesia reinduced in 1 minute. The same rapid recovery after removal of second tonsil. Soreness in throat was not detectable for over one-half hour and during this period patient took nourishment. She considered the whole procedure a very pleasant experience. Amount of ether used 1.5 ounces. Throat reflex present before each tonsil was completely removed. Surgeon: Dr. Perfect. Witnesses: Drs. H. Harrison and Carveth.



MODIFIED VAPOR APPARATUS FOR ETHYLENE ETHER.

Case 2. Patient, Mrs. B.; age 35; weight 115 lbs.; operation, removal of 14 teeth. Administration: author's apparatus, patient in sitting posture. Time of induction 4 minutes. Patient held her own mouth open. Did not complain of pain for 10 minutes. Anesthesia was reinduced in 2 minutes and the remaining teeth removed. Patient was quite awake all the time and was able to walk about afterwards. Amount of ether used 1.5 ounces. Surgeon: Dentist. Witnesses: Drs. Carveth, Perfect and Harrison.

Report from Mrs. B.: Arrived home about 1:30 P. M. feeling pretty good considering, so much so that I walked home rather than get in and out of street car. Had a cup of tea and soaked biscuit and laid down. When taking the ether I did not have any going away sort of feelings and was not at all nauseated. I can remember coming round partly before the dentist finished, but it caused me no pain. I could have eaten hot roast pork had there been any and my mouth permitted.

(Signed) LILLIE BOOTH.

Case 3. Patient, female; age 35; weight 115 lbs.; operation, cholecystectomy and appendectomy. Administration: author's apparatus. Time of induction 5 minutes. Previous pulse 100; pulse during operation 70. Relaxation during first part of operation easily obtained. Duration of operation 1 hour and 20 minutes. Amount of ether used 3.5 ounces. Regurgitated 4 ounces, but did not remember it or suffer from after nausea. Patient was able to walk while being returned from the operating-room. Surgeons: Drs. Perfect and Harrison.

Personally I have found that by open methods, although the amount of ether required is not large, patients recover so rapidly from deep stages of anesthesia that a careful and even drop-rate administration is required. By the oxygen semi-closed vapor apparatus the maintenance of anesthesia is much more regular. If anesthesia is badly administered, however, a certain amount of salivation may result. The Carveths of Toronto consider the new ether ideal as an induction anesthetic, for it is very rapid, and out of a fair number of cases they have not yet noted any excitement stage. They maintain anesthesia by any method whatever, except in abdominal work. Here, they state that the patient's muscles cannot always be completely relaxed, although there is never any muscular spasm. This opinion has been corroborated by some other anesthetists and therefore deserves consideration.

POSTOPERATIVE NAUSEA AND VOMITING.

For years,. postoperative nausea and vomiting have been recognized as the great disadvantages of etherization. In a previous paper it was shown that carbon monoxid may be produced by the superheating of ether in contact with metal and the slightest trace of this poison, when present in ether, will cause severe nausea. It is frequently introduced into ether by the high temperature from soldering the can. *It must also be remembered that if an ether is not a sufficiently potent anesthetic, due to the absence of its synergists, a very large amount of the ether or narcotic group will have to be administered, and postnarcotic nausea and vomiting must follow.*

With ethylene-ether nausea and vomiting after patients have awakened has not yet occurred, as far as the author has been able to secure information, but regurgitation before awakening has taken place in the use of oxygen semi-closed methods of etherization when the administration was stopped too abruptly.

In selecting patients for this anesthetic attention should always be paid to the urinary analysis in order to detect the presence of any degree of acidosis. In judging the sickening effects of any anesthetic it is well to bear in mind the following two facts: (1) Postoperative nausea rarely occurs in elderly people, especially when they are suffering from any degree of heightened blood-pressure; and (2) a certain class of operations having to do with the intestines and especially the gall-bladder, will, of themselves, give rise to nausea and vomiting.

ANALGESIA.

This whole research was undertaken to develop some reliable method of producing analgesia, especially for the handling of war wounds, and during its course the following data were secured for study:

Exhibit A—Comparison of Induction Analgesia with Absolute and Ethylene Ethers: Oxygen Semi-Closed Method. Absolute ether was first administered to 12 cases and the results studied relative to blood-pressure, pulse-rate, analgesia and after-effects. Two days later a similar series of administrations were undertaken on the same cases with absolute ether containing a large amount of ethylene derivatives.

With the absolute ether the blood-pressure immediately rose 16 to 20 mm., systolic, whereas when ethylene was present, in half the instances it dropped 10 mm., in three it remained normal and in the remainder it rose 10 mm. With absolute ether analgesia resulted in six cases, while the other six patients became hypersensitive and remained so until they fell asleep. *The period of analgesia occurred in all cases in which ethylene ether was administered, long before the patients became unconscious.*

Patients inhaling absolute ether complained of a very depressing sensation during the induction and most of them went into a struggling stage, at which point the administration of the anesthetic was stopped. Their recovery was exceedingly slow and violent headaches invariably occurred within an hour. Those patients taking the ethylene-ether enjoyed going under; there was no excitement or struggling stage; recovery was almost instantaneous and none complained of unpleasant after-effects.

Exhibit B—Rebreathing of Oxygen. As methods involving the rebreathing of oxygen had been found useful for the administration of ethylene-ether, it was thought desirable to study them more closely. Vapor-apparatus similar to that described under Anesthesia was used. The ether container was filled with caustic potash sticks in order to absorb any accummulation of carbon dioxid. An excess of oxygen was given,—10 to 20 litres per hour, and the blood-pressure readings were closely followed in 20 cases. Eighteen of these showed a slight drop in systolic and a fair rise in diastolic pressure. The other two had their rise in diastolic, but their systolic pressure did not vary. The pulse-rate remained normal in all cases.

Exhibit C—Blood-Pressure Variations. The figures in Chart I are the average of those recorded with a commercial ether containing very little ethylene and those in Chart II with an ethylene-saturated ether, respectively.

BLOOD-PRESSURE VARIATIONS: CHART I.

	Pressures			Pulse	
Time	Systolic	Diastolic	Pulse	Rate	
Previous	120	80	40	80	
1	150	70	80	116	
2	160	72	88	96	
3	160	90	70	80	Beginning Analgesia: not Surgical
4	130	100	30	80	
5	135	110	25	80	
5.5	145	118	32	80	
6	150	118	27	80	
6.5	140	90	50	80	
7	130	85	45	90	No Analgesia
7.5	128	90	38	100	
8	120	85	35	110	
8.5	118	100	18	100	
9	115	105	10	90	Struggling Stage
9.5	110	85	35	90	

BLOOD-PRESSURE VARIATIONS CHART II.

An ethylene saturated ether.

	Pressures			Pulse	
Time	Systolic	Diastolic	Pulse	Rate	
Previous	120	75	40	80	
1	130	90	40	90	
1.5	140	100	40	100	
2	140	105	35	80	Analgesia to Surgical Degree
3	140	100	40	80	
4	120	90	30	72	Sleep
80 mins.	120	90	30	72	Anesthetic stopped
85 mins.	130	90	40	85	

From these figures it is readily seen that the ethylene group acts as a stabilizer of the circulation. Relative to the struggling stage it was observed that this complication always seems to occur when the pulse-pressure was extremely reduced by a decrease of systolic as well as a rise in diastolic blood-pressure. Patients, sufficiently conscious at this stage, blamed their restlessness on a peculiar numbness,—not analgesia, as well as a hollow sensation in the abdomen. With the onset of sleep there always occurred a drop of about equal degree in both the systolic and diastolic pressure. Whether this drop is responsible for sleep is a question that can only be satisfied by circumstantial evidence.

THEORY OF ANALGESIA.

Bearing in mind the data developed in *Exhibits A, B and C*, it is of interest to study the various physico-chemical changes of *state of solution* and *vapor tension* of ether as it passes through the blood stream, with the view of determining how ethylene synergists may act in producing analgesia.

The boiling point of absolute ether is about 34.5° C. When ether is administered it passes through the walls of the alveoli to enter into solution in the blood circulating in the lung tissues. The temperature of this blood is between 36° and 37° C., or 1.5° to 2.5° C. above the boiling point of ether. On this account an ether-gas-tension will develop, thereby limiting the amount of ether that can enter the blood stream.

The point of maximum heat production in the circulation is in the end capillaries of the peripheral tissues where combustion takes place. Here the temperature suddenly rises to over 39° C. It will be easily understood, therefore, that when the ether from the lung tissue reaches this point through the arteries, the gas tension will be enormously increased, both on account of the lowering of pressure and the increasing of temperature.

Ether, like alcohol, acts centrally and otherwise on the nervous system to cause a general vasodilatation, thereby slowing the blood stream in the capillaries and reducing the metabolism and temperature. This is shown by the drop in diastolic pressure taking place on the administration of absolute ether.

Volatile anesthetic substances enter the blood stream at the lung capillaries much more slowly than does ether. If they are present in the ether administered, the vasodilatation caused by the ether will be replaced by vasoconstriction as soon as they gather in the peripheral circulation in sufficient concentration. That is, the administration of an ether together with these anesthetic gasses, is followed by a short period of vasodilatation, succeeded by vasoconstriction and increased capillary combustion. During this vasodilatation the heart will beat more rapidly due to the relief of pressure, but as soon as vasoconstriction develops, the pulse slows down with the increasing resistance.

It has already been emphasized that when ether only is present in the blood stream there is an ether-gas-tension increasing in the peripheral tissues, which is lessened according to the resulting vasodilatation, by the reduction in metabolism as well as the relative approximation of blood-pressure between arteries and capillaries. Thus it can be seen that when the ether-gas-tension in the capillaries becomes very great and these capillaries are constricted, there will be an enormous escape into and retention of ether in the surrounding tissue fluids, and the ether becomes concentrated in the lymph and tissue cells. When this concentration is sufficient the sensory nerve endings lying in the tissue fluid will become insulated and no longer able to function. The motor nerve endings are not affected as they enter directly into the cells that they govern.

In the central nervous system, where the metabolism is not nearly so great, the ether will not localize. In other words, if the capillaries throughout the body are kept normally constricted, ether will localize in tissues according to their state of metabolic activity and this localization produces localized analgesia by sensory nerve ending insulation. The blood-pressure curves, already charted, show that ethylene and carbon dioxid (as we have already assumed), tend to equalize the circulation by lowering the systolic as well as raising the diastolic pressure. Oxygen, as has been shown, does practically the same thing, to a much less extent, and therefore might also be classified as a synergistic gas.

It must be remembered in this connection that volatile anesthetic substances cannot maintain constriction of capillaries unless the nerve control of these capillaries is healthy; and without this maintenance marked analgesia is impossible. Bearing on this point is the fact that it is exceedingly difficult to obtain analgesia (without narcosis) in patients suffering from anemia, hemorrhage, syphilis and prolonged fever.

METHODS FOR OBTAINING ANALGESIA WITH ETHYLENE-ETHER.

These methods aim to utilize all the gasses in ether, as the analgesic power of an ether depends on their presence.

Method A—Open Mask Administration direct from Ampule. An arrangement such as described under *Method 2* in Anesthesia was found convenient.

ILLUSTRATIVE CASES.

Case 1. Female; weight 180 lbs.; age 42; operation, breast amputation; time of operation, 45 minutes; anesthetist, Dr. Carveth. Patient capable of talking throughout whole of operation. She had no pain whatever and could not feel on what part of the body they were working. Ether used, 5 ounces.

Case 2. Male; Base Hospital, Toronto; weight 150 lbs.; age 48; operation, resection and cauterization of part of abdomen for cancer; time of operation, 1 hour. Patient capable of talking throughout and quite clear mentally. He complained of being hungry before the hour was up. Pain returned within 3 minutes of cessation of anesthetic. Ether used, 3 ounces.

Case 3. Male; age 18; weight 180 lbs.; operation, adhesions and resection of tubercular mass from abdomen. Time of operation, 1 hour and 10 minutes. Patient remained very clear mentally and cracked jokes throughout. He was given a small meal while the surgeons were operating on him. Abdomen was completely relaxed, except at one time when he insisted upon kissing the nurse. Eyes were slightly dilated and pulse remained at 80. Amount of ether used, 3 ounces.

Case 4. Male; aged 48; weight 132 lbs.; operation, opening and scraping abscess. Time for induction, 5 minutes. Senses dulled and unable to talk clearly. Length of operation, 12 minutes. Amount of ether administered, 2 ounces. Patient held his breath for one-half minute during recovery, which was complete in one minute. Patient then changed tables himself. There were no after-effects. Surgeon: Dr. Harrison. Witness: Dr. Carveth.

Case 5. Male; aged 33; weight 190 lbs.; returned soldier; operation, opening arm. Patient complained of feeling dull, but otherwise felt normal. Time of operation, 45 minutes. Time of induction to analgesia, 6 minutes. While under he stated he did not simply want to lose sensation to pain but that he wished to go to sleep, as he was tired. Amount of ether used, 3½ ounces. At two previous operations it was impossible to induce him with commercial ethers and chloroform had to be resorted to.

Case 6. Male; aged 42; weight 140 lbs.; operation, resection of teeth from ankylosed jaw. Time of induction, 4 minutes. Time of operation, 1 hour and 40 minutes. Amount of ether used, 6 ounces. Patient sat up and held his head in position while teeth were resected from jaw. He had no sensation whatever to pain. He answered the phone twice during the operation and seemed to be in possession of all his mentality.

Case 7. Comparison of Cotton Process Ether with ordinary C-E Mixture. Patient, aged 24, on account of a recent attack of pneumonia, was to be operated on under local anesthesia for an acute appendiceal condition. She was given ¼ gr. morphin and 1/200 gr. atropin as a preliminary, as she was exceedingly nervous. At 11 P. M. she entered the operating room and the skin over the site of the operation was carefully infiltrated with 0.1 per cent. anocain solution. Six minutes later the incision was made, but the patient was unable to stand further manipulation on account of the deep soreness of the underlying abscess. At the request of the surgeon the houseman started the administration of the C-E Mixture. The patient became excited, and after 1½ ounces had been used she dropped into a light sleep, but the abdominal muscles were extremely rigid and there was a tendency to stop breathing. The incision made through the anterior aponeurosis was followed by severe muscular spasm. I then suggested the use of an ampule of ethylene-ether on the open mask. The patient was allowed to wake up and the ethylene-ether was then given on the open mask, without the usual surrounding towel. Within four respirations her muscles relaxed completely and she was entirely without sensation, although she was able to answer questions clearly and was not excited, and would do anything requested. The operation continued and the abdomen was opened. The appendix had not ruptured, but the whole of the cecum was adherent to the abdominal wall and pelvis. One ounce of ethylene-ether had been used by this time and as another ampule had to be fetched from the storeroom, the C-E Mixture was again administered to note its effect. Sensation returned and the patient became blue if the C-E Mixture was pushed. Ethylene-ether was again used. The patient woke up and was able to talk. Her abdomen again relaxed. Operation continued for one hour. Adhesions were broken down and the appendix successfully removed. Three ounces of ethylene-ether was used. During its use, at any time during the operation, the patient could have walked as easily as she talked. Afterwards she remembered answering questions but did not know anything about the operation while under the ethylene-ether.

One peculiar fact was noted. While under ethylene-ether the pulse ranged about 80 and under the C-E Mixture it would immediately rise to 120. The patient stated that she was hungry and thirsty during the operation, as she was also afterwards. There was slight dilatation of the pupils, but otherwise they were normal. They would roam about when covered, but fixed on any object when allowed to see.

Patient was as clear mentally at the end of the operation as at the beginning. Pain recurred within 3 minutes after cessation of the anesthetic.

Other Cases.

15 Obstetricals: These patients were entirely relieved from pain, without reduction of the expulsive effort. Six were primiparae and in four forceps had to be resorted to. One case was an induced delivery of a dead fetus at 8 months, while in another instance operative measures were required on account of hydrocephalus.
59 Cases of successful Analgesia reported by Dr. Hudson.
9 Dental cases reported by Dr. Carveth.
32 Dental cases reported by the Dental Department of the Toronto General Hospital.
6 Dental cases for relief of pain for drilling.
6 Breast Abscesses.
40 Administrations for Dressings.
1 Epispadias Operation.

2 Hernias.
4 Varicoceles.
4 Abdominal Operations.

B—Bottle Inhaler Method. Two varieties of this apparatus have been perfected. In each a bottle capable of holding at least 4 ounces was used. The cork in the simpler form was perforated by two tubes, one of which opened to the air and the other T'd off to nasal tubes coming from the nose of the patient. Ether was introduced through open tube to the bottle and patient breathed in through the nose and out through the mouth, as required. Valves were later introduced to prevent the patient from breathing back into the ether bottle. In the more complicated variety the same principles were accomplished by a single perforation of the bottle cork by means of sleeve tubes connected with the valve. This method of administration was found quite unsatisfactory in a number of cases, as it was difficult to teach patients how to breathe, and they would constantly forget as their memory became undermined by the ether. It was used successfully in over 100 administrations for painful dressings and in 20 obstetrical cases. In deliveries, however, a number of failures to secure satisfactory analgesia, by this method of administration, have been reported.

WAR ADMINISTRATION.

Open mask administration in war surgery would be out of the question, as the patients are difficult to induce and it is important to conserve every particle of ether on the battlefield. With this end in view the inhaler bottles were at first thought suitable. Dr. Foot, now in service, attended to the origination of the details of these bottles. They proved unsuitable, as too much time had to be consumed in each case teaching the patients how to breathe properly.

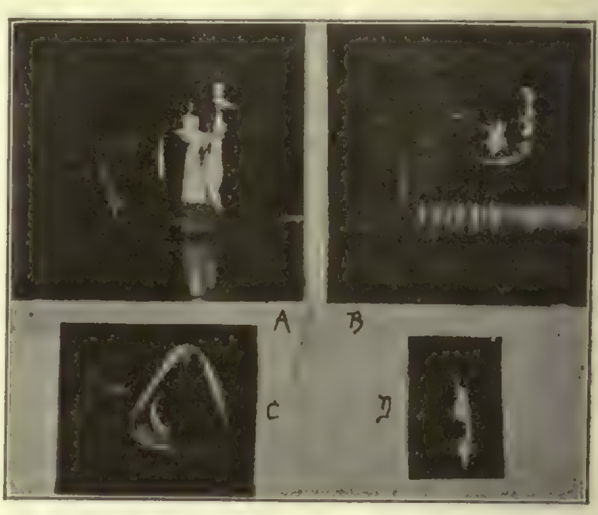
The mask, herewith illustrated, was then conceived and made by the author, and it accomplishes the purpose. With its use analgesia results after four breaths of the anesthetic have been taken and one only depends on the patient to hold the mask in place.

One case lately demonstrated at the Western Hospital was a woman who had been knocked down by a motor car and had her clavicle fractured. She was prejudiced against taking any anesthetic until told that she could give it to herself. The patient talked throughout the whole operation and was entirely without pain until six minutes after the anesthetic was stopped. She then stated that she wanted more of it as it made her happy. There were, of course, no after-effects. Major Harrison of the British Army was in charge of this case. A second case was undertaken with this same apparatus. The patient was 70 years of age and weighed 110 lbs. The operation was to open a knee joint. It required 2½ minutes to induce analgesia. The time of operation was 12 minutes. About one ounce of ether was used and the patient was not at any time abnormal mentally.

For ordinary dressing cases or the probing of wounds, only 1 or 2 cc of ethylene-ether are required when this mask is used. As many as 12 dressing analgesias have been induced with one ounce of this ether.

CIGARETTE INHALATION AND WAR ANESTHESIA.

One very important point with regard to war surgery is that of cigarette inhalation immediately previous to anesthesia by any ether. If the soldier patient has inhaled cigarette smoke within ten minutes of his induction, the systolic blood-pressure will rise from 30 to 100 mm. beyond that rise which would normally take place, and even dilatation of the heart may result. He will also invariably suffer from a headache afterwards. Cigarette inhalation following an anesthetic always aids the recovery of patients from the effects of the ether.



The photos are, for the most part, self-explanatory. Figs. A and B., view the mask from the side, while C. shows the face part. Fig. D. represents the shutter by which the ether is turned off and on. With the handle of the shutter turned toward the nose the patient breathes directly into the bag. The shutter is rotated toward the Intake Tap to turn on the ether. The anesthetic can be poured into the vaporizing chamber by unscrewing the tap or an aliquot can be introduced direct from the ampule by inserting it into the Intake Tap.

For prolonged analgesia or anesthesia oxygen is run into the bag at the rate of from 6 to 12 liters per hour. If the accumulation of carbon dioxid becomes excessive in the bag, and the patient's breathing becomes sterterous, the bag is emptied of its gases and the patient is allowed a few breaths of air. For brief analgesia or anesthesia oxygen is not required and the patient is ordered to fill the bag with one or more big exhalations before the anesthesia is started.

NECESSITY FOR EXPERT ADMINISTRATION.

Many have compained to the author that in order to use this gas-ether they had to learn new and complicated methods of administration, and they did not seem to recognize that this knowledge simply allows them to understand the materials they thought they were so familiar with. In fact, the complaint only goes to emphasize that anesthesia is a specialty requiring the highest possible education in both chemistry and physiology. Unfortunately, certain members of our profession, due most likely to their lack of interest in the subject, have adopted the layman's view that an anesthetist is a mechanical technician, who pours a certain dose of an anesthetic down the neck of his patient. The places of these few might, with profit, be taken by a nurse or trained orderly, as such could certainly not be called anesthetists. They are, at best, assistants to the surgeon. If this view is persisted in it wil not only endanger human life, but further progress in anesthesia will be completely blocked and a blissful ignorance will reign.

A number of nurses, who have witnessed analgesia work with gas-ether for dressing cases, have been delighted, inasmuch as they considered the thing so simple that it represented the beginning of the reign of nursing anesthesia. For light analgesia, such as is required in the dressing of fresh wounds on the battlefield, anesthetist technicians may be able to use this ether and method of administration, when emergency demands, but for major surgery a great deal more knowledge of the intricacies of anesthesia is required for its use than has heretofore been necessary.

This whole research was persisted in for the sole purpose of securing an ether for painful dressings, and if it can be utilized efficiently to make things more bearable for the boys at the Front, our purpose will have been completely accomplished. The theoretical and operative work mentioned in this paper were simply undertaken to this end and the results are given to the profession for what they are worth.

793 Spadina Street.

The American Association of Anesthetists will hold its Seventh Annual Meeting in Atlantic City June 9-10. An interesting and instructive program is being developed and among the prominent surgeons, anesthetists and research-workers who will present papers may be mentioned Yandell Henderson, Wm. de B. MacNider, Jos. E. Lumbard, Frank Dyer Sanger, Griffith S. Davis, F. L. Richardson, Fenton B. Turck, Robt. H. Ferguson, Wm. B. Howell, A. W. Adson, Frank C. Mann, Albert H. Miller, S. P. Reimann and others. It will repay you to attend this meeting.

DEATHS DURING AND FOLLOWING OPERATIONS IN RELATION TO THE SURGEON, ANESTHETIST AND HAZARDOUS RISK.*

E. M. Sanders, M.D.
Nashville, Tenn.

Introduction:—When death occurs during the administration of a general anesthetic, or immediately thereafter, we are brought face to face with a very trying ordeal; and, as a rule, the attendants are so disconcerted, for the time being, that it is well nigh impossible to get the facts when we come to investigate the matter later.

When we review the history of the early days of anesthesia, we are forcibly impressed by the prompt and painstaking reports of the deaths that were believed to be due to the anesthetic. An investigation of the same subject today is most disappointing, for the reason that we are not reporting a sufficient number of such deaths to make the records instructive and trustworthy; and, when we do report the case, autopsies are the exception and not the rule; and when a postmortem is done and the findings recorded, we usually get a meager previous history and a poor clinical picture of the patient, and very few of the essential facts leading up to the death.

Conclusions:—After due consideration of the available material, I am able to reach but two conclusions: *First,* that the crusade against chloroform should be vigorously carried on; and *second,* that the administration of gas should be left to the expert. Everything else is more or less unsettled.

For me to come and recommend ether, chloroform, gas, or any other one agent as the ideal drug, or any method of administration as the best, or any combination or mixtures or sequences to be safest in all cases, or any class of cases, would be a reflection on the intelligence of my hearers; for you well know that in this work there should be no routine.

VARIETY OF ANESTHETICS.

When one sees the great variety of agents, and complicated apparatus being used, in many instances by incompetent anesthetists, and the recklessness with which the hazardous risk is approached today, the first thought is very much like the impression the country man gets when he is whirled through the streets of our crowded cities in an automobile. He wonders why more people are not hurt, when the facts are a great many more are hurt than he supposes. Just so with our anesthesia. We are having an untold and alarming number of anesthesia deaths—most of them never being heard of outside of the immediate surroundings in which they occur.

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*Read during the Sixth Annual Meeting of the American Association of Anesthetists, Auditorium Hotel, Chicago, Ills., June 10-11, 1918.

WHERE DEATHS OCCUR.

This deplorable condition of affairs is largely due to the fact that anesthesia deaths seldom occur in the practice of our noted surgeons, who throw around their patients every known precaution, and who work in large, well-managed institutions, from which we get complete and instructive data. The larger percentage of anesthetics are administered outside of hospitals and in small and medium-sized institutions, where the facilities for doing scientific work and keeping records are far from ideal; and it is in this class of work that most deaths occur. Furthermore, it is this element of the profession that we find most dilatory about holding up for inspection such misfortunes as might reflect on their reputations and interfere with their income.

INCREASE OF FATALITIES.

Since it is impossible to get the whole truth about this subject, I will have to ask you to pardon me for giving an opinion, which is that we are getting one anesthesia death today in about every one thousand administrations, taking all general anesthetics as a basis. This includes all cases chargeable to the anesthetic, the surgeon, and the hazardous risk. This sounds discouraging and exaggerated—for Fleming, Miller, Teter and others have gathered statistics much more favorable; but their figures have been compiled from the records of our best institutions, and many of them are not of recent years, and include only the ones chargeable to the anesthetic. Unless my estimation is far wrong, our anesthesia death rate is increasing, and not improving as it should be. Therefore, it behooves us to try to find the cause and correct it.

CAUSES OF DEATH.

In my judgment, there are a number of factors responsible.

First:—It is the trend of the times to minimize the importance of anesthesia, and our anesthetists today are less skilled and more careless than ever before.

Second:—All sorts of drugs and mixtures are being used, frequently in a spirit of experimentation, by incompetent and unscrupulous anesthetists in a large percentage of the work. Therefore, alarming consequences are naturally resulting. It is to be regretted that we have utterly failed thus far to standardize general anesthesia and anesthetists to any satisfactory degree.

Third:—Another reason for a pardonable increase is the fact that we are undertaking to do surgery on more and more hazardous risks, as time goes on. And as we become more skilled and provided with better means to combat the causes of such deaths, it is our duty to lend a helping hand to a certain class of hazardous risks on whom we have turned our backs in the past, and denied them their only chance. This state of affairs will naturally result in more sudden deaths on the table; and it should not be our ambition to build up favorable statistics. On the other hand, it is our plain duty to serve the sick and afflicted, forgetting our own reputations, and with but one thought, and that is to apply the Golden Rule in every case, and do for the patient as we would want to be done for.

Fourth:—The chief cause is the untrained and reckless surgeon, whose indifferent attitude and conscience allow him to use the interne anesthetist, or doctor who gives anesthetics *on the side*, or someone else without fundamental medical education, who does the work on a contract basis as a matter of routine, and usually looks on the procedure with over-confidence or a criminal indifference.

These would-be surgeons not only use bad judgment in selecting the anesthetist, but usually also the drugs and methods. They individually presume to pass on the patient's fitness to undergo the operation, and as a rule, order all preparation, even the preanesthetic hypodermic, without due consultation with an internist or the anesthetist.

The anesthetist sees the patient for the first time in the operating room, begins the anesthetic without knowing anything about the risk, whether or not it is particularly hazardous; and without regard for such precautionary and protecting measures as may be definitely indicated.

I am glad to say for my confreres that this type of surgeon belongs to the small minority, but I fear they are on the increase, and if this is true, it is sufficient justification for the belief that sudden deaths on the table are becoming more frequent.

CLASSIFICATIONS.

To get at something like a classification of the fatalities under discussion, we must make an effort to fix the blame on someone for all deaths occurring during general anesthesia and immediately following it, being caused directly or indirectly by the anesthetic agent or other drugs given in connection with it, or to any procedure to which the patient is subjected while anesthetized.

It is necessary to further divide the deaths into the ones that might have been averted had certain precautionary measures been instituted, and the ones caused by agencies over which the anesthetist and surgeon could not have had any control.

To place the responsibility of such a death is a most difficult task, and will usually require a thorough investigation of all the facts and a candid report, regardless of where the burden falls.

ANESTHETIST'S RESPONSIBILITY.

No progress can be made until we establish the relationship of the anesthetist and surgeon. If the anesthetist is of the doormat variety, he is not responsible for anything that happens; but if he is allowed to use his own initiative in the selection of the drugs and methods, and his discretion as to the patient's ability to take the anesthetic, and does his work with a free hand, he certainly should be held to account for such accidents as cannot be fairly charged to the surgeon or the hazardous risk.

SURGEON'S RESPONSIBILITY.

If the anesthesia is satisfactory, and the surgeon by slow, bunglesome, or reckless methods loses an unwarranted quantity of blood, and adds a fatal shock by trauma and bad technic, the responsibility is absolutely his.

HAZARDOUS RISKS.

When every precaution has been employed to investigate and judge the patient's condition, and death occurs on the table under ideal anesthesia during the progress of a well-planned and skilfully performed operation, the accident should be looked on as unavoidable, and the anesthetist and surgeon should not be censured.

Deaths will occur in the best surgeon's work, where the best anesthesia has been produced—deaths that surprise and shock us, being the natural consequences of subjecting a certain class of patients to the mental and physical strain necessarily accompanying the procedure as a whole to which they are subjected in our efforts to relieve them.

To circumvent such mortality we have searched for newer and safer combinations to anesthetize certain classes of cases, and in some of our efforts we have wandered far afield, only to realize the urgent necessity of returning to our old friends—drugs and methods long since mastered and proven worthy.

DEFINITE CAUSES.

In the light of our present facilities we can certainly definitely place the responsibility in nearly all cases. There should be very little element of doubt as to just what brought about the fatality when the patient dies of—

(1) Shock.

(2) Hemorrhage, primary or secondary.

(3) Overdose of the drug, paralyzing the higher centers.

(4) Underdose, where heart fibrilation or paralysis occurred.

(5) Acute dilatation.

(6) Acapnia.

(7) Postoperative pneumonia; or

(8) Acidosis.

But occasionally some rare pathological lesion, such as lymphaticus, or embolus, will be the underlying cause, and well nigh impossible to locate.

THE REMEDY—CONSULTATION.

With this bewildering complexity confronting us, what can be done to better the situation? *First*:—A definite consultation should be held by the surgeon and anesthetist in every case, be it ever so brief. The salient points of a given case can be discussed rapidly and satisfactorily by workers who are in close contact, and precautions inaugurated, when indicated, that will result in greater safety for the patient.

SAFEST DRUGS.

Second:—We must, as anesthetists and surgeons, with our co-workers, insist on the safest drugs, considering always the individual patient and the experience and training of the anesthetist.

PREPARATION OF PATIENT.

Third:—The preparation of the patient should be carefully carried out, and many post-operative complications directly traceable to the present day curse of hurrying into our cases without sufficient time to study the patient's needs will be averted.

SELECTION OF HEART CASES.

Fourth:—Greater precautions should be used in the selection of doubtful heart cases. Cashman has studied the pulse pressure test in preoperative estimation of the reserve strength of the cardiovascular system, and says the patients with little reserve, and who respond so poorly to light strain should no more be subjected to a severe operation than to a cross country run.

Crotti in his book on "Thyroid and Thymus" recommends the Katzenstein test for functional capacity of the heart, and says that he has employed it with great satisfaction for the last four years. This test is particularly applicable to goiter and other cases where myocardial degeneration is suspected, frequently found complicating gall-bladder disease, and in that type of patients who are operated on for prolapse and fibroids, the middle-aged women with overweight. He says the test is very accurate and valuable; and every time cardiac postoperative complications have occurred in his work, the Katzenstein test previously made had been positive.

PURITY OF AGENT.

Fifth:—Strict attention should be given to the purity of the agent used by the anesthetist. Dr. Herb calls attention to the danger of using impure drugs, and warns against the administration of ether which forms snow on the wick when left standing, or freezes on the cone. Warner has pointed out the danger of impure gas, and his work has done much to remedy the evil. There is abundant evidence to prove the danger of chloroform which has undergone changes, and it is not only dangerous during its administration, but also in its delayed effects.

THE FINE POINTS OF ADMINISTRATION.

Sixth:—The technic of administration is a most vital issue in the prevention of death, both primary and secondary.

ALL METHODS DANGEROUS.

There is one thought that must never leave us, and that is that all anesthetic agents, general or local, are more or less dangerous, and that the ideal anesthetic agent and method has not been found.

IMPORTANCE OF MEDICAL EDUCATION.

When one studies the work of that master in this field, Yandell Henderson, he is impressed with the importance of employing an anesthetist whose education is well grounded on a scientific foundation; and it is unreasonable to expect the untrained mind to grasp many of the intricate problems daily confronting the anesthetist.

DANGER OF PARTIAL ANESTHESIA.

Levy and others have shown conclusively that it is during light or partial anesthesia that chloroform and other anesthetic agents are so dangerous, and that cardiac fibrillation and paralysis are most apt to occur at this time, and when the patient is coming out, or having the drug reapplied, just when the amateur anesthetist thinks he is doing fine keeping the patient under very light or partial anesthesia. We all know that there is such a thing as giving an overdose of the anesthetic, but this is the exception and not the rule, when death occurs.

CONCENTRATION OF VAPOR.

The concentration of ether vapor is an important factor in the production of postoperative pneumonia. Dr. Herb warns against the intermittent administration of the drug, which allows the signs of returning consciousness to appear, at which time the anesthetist in his haste to get the patient under again, concentrates the vapor until it is above the safety margin—six or seven per cent—and says that a highly concentrated vapor will do more injury to lung epithelium in a few minutes than a dilute vapor will during a long anesthetic. Any concentration of ether vapor which produces coughing as the patient goes under is dangerous, and if continued, and complications result, the responsibility rests on the anesthetist absolutely.

POSTOPERATIVE PNEUMONIA.

The work of Armstrong, Whipple, Bancroft, McKesson, and others who have collected a large series of cases with about three per cent of lung complications and a total mortality of a little more than one per cent, brings out the great importance of this postoperative fatality, which belongs largely to the anesthetist. They warn the anesthetist about his responsibility when he allows the patient to struggle for inhalation through mucus and by a malplaced tongue, which may bring about such exaggerated negative pressure that an edema of the lungs is produced with an excessive flow of fluid into the alevolar cavity, reducing the resistance of the tissues, and inviting the onset of coagulation.

McKesson suggests as the remedy for reducing these too frequent pulmonary complications that more attention be paid to maintaining the body heat of the patient at all times, and especially during the trip from the operating room to the patient's bed, the keeping open of the air passages from obstruction, changing the patient's position at frequent intervals during the first week; the elimination of tight binders over the diaphragm; the encouragement of full breathing; and especially the avoidance of the administration of ether where it is contraindicated.

Homans divides these postoperative lung complications into three classes: *First*:—Those directly dependent upon the narcosis and resulting from the inhalation or aspiration of septic material from around the teeth, tonsils, and nasal mucous membranes into the lungs. *Second*:—Hypostatic pneumonia, depending upon feebleness of the circulation. *Third*:—Definite pulmonary emboli.

The first division; namely, aspiration of septic material, falls largely to the anesthetist, as it is his business to keep the mouth free from froth, and not allow it to be churned back and forth until it is finally aspirated into the bronchial tree. The system of preparation of the patient inaugurated by the surgeon should include previous proper oral hygiene, however, and therefore the surgeon comes in for a liberal share of this responsibility.

MENTAL CONDITION.

Seventh:—More attention should be paid to the mental preparation of the patient; the so-called *psychological atmosphere* cannot be over estimated, and this problem is largely up to the anesthetist, who with real brains and tact can work wonders in this field of endeavor.

Ferguson has told us that the question of fright is an ever present problem in practically all cases. In some instances the best results are obtained from the efforts of the surgeon, who should never be too busy or too indifferent to attend to the mental comfort of his patient. In some cases the medical man in charge is more powerful in reassuring the patient who has implicit confidence in him. But in all cases, it is clearly up to the anesthetist to get acquainted with the patient, and to exercise sufficient reassurance to establish in the patient's mind absolute confidence; first, in his honesty of purpose to administer a gentle, painstaking, and careful anesthetic; and second, to prove that he is thoroughly capable of doing his work. If we fail in our efforts, and the patient comes to the operation room extremely nervous and badly frightened, the operation should be postponed.

BLOOD PRESSURE.

Eighth:—Particular attention should be paid to the value of blood pressure where serious surgery is being done. The institution of this precautionary measure is a joint responsibility shared by the anesthetist and the surgeon alike, and guides both as to what *not to do* to a very accurate degree.

IMPORTANCE OF EARLY RECOGNITION OF DANGER SIGNALS.

The milk in the cocoanut is, after all, for the anesthetist to stay awake, and talk to the patient, and to no one else, because the greatest opportunity to prevent anesthesia deaths is in the hands of the anesthetist, who must recognize the danger signals before it is too late. To watch constantly the blood pressure, the pulse rate, the behavior of the pupil, the color of the skin, and the respiratory rhythm, will engage the entire attention of a master mind; and the anesthetist who goes to sleep on the job, or engages in distracting conversation and amusement while conducting a human being through the critical stage of suspended animation is absolutely unfit for the work, and should be denied the responsibility. The anesthetist can save the lives of many people by being eternally energetic and untiring in his efforts to discharge the sacred obligation he has assumed.

I agree heartily with Gallagher, who says that: "Improvements in anesthesia have done more to lessen surgical mortality than any other one thing since the discovery of asepsis"; and: "That a thorough co-operation between the surgeon and the anesthetist is absolutely necessary to the working out of the proper technic required to enable the surgeon to avail himself of the very best results in anesthesia for the benefit of his patient."

SURGEON'S RESPONSIBILITY.

If we ask the anesthetist to do so much, the surgeon certainly should be willing to do something, and I would suggest to the surgeon that he work constantly with the best internist and anesthetist to be had; that he take plenty of time to study his cases before operation; that he refrain from the great temptation of doing too many operations at one sitting; and that he never pull teeth and do tonsillectomies on abdominal and other major cases under the same anesthesia; and that above all, he stand with, and not against, the professional anesthetist.

The surgeons of this country could largely correct the present-day evils in this field, if they would turn their attention vigorously and unselfishly to it; and this I believe they will do; for, as a rule, the surgeon who sees that he gets the best anesthesia to be had under the circumstances is also a rapid and skillful operator, who has developed a high grade of technic, and is possessed of good judgment and a keen conscience.

I regret that I cannot bring to you original, or research data; but the literature is teeming with the brilliant results of your own labor; and I have endeavored to discuss the subject briefly in my feeble way from the standpoint of the surgeon only. I am glad to bring a message of our appreciation of your past efforts, and an expression of our gratitude for what you have already accomplished; and to frankly confess our dependency on you for satisfactory results in our work, and to pledge ourselves to a closer cooperation and a more elevated standard of anesthesia.

SUGGESTION TO IMPROVE PRESENT CONDITION.

I desire to bring one suggestion; and that is that this association, through its president, secretary, and one other member chosen from its membership by the president, form a committee to draft a blank to be furnished to all hospitals, and others on request, on which sudden deaths on the table, chargeable to the anesthetist, the surgeon, or the hazardous risk be reported in detail, that a definite collection of data may be built up from which to draw conclusions in the future. Such a system of records will, in my judgment, *First*:—Do much to promote general interest in the subject of anesthesia. *Second*:—It will bring the anesthetist and surgeon and their coworkers closer together on a more satisfactory working basis; and expose our faults to such a degree that unscientific methods will be forsaken, and indifferent workers stimulated to a more conscientious attitude. *Third*:—It will establish a definite standard to guide us in the choice of anesthetic agents, and their various modifications and sequences and methods of administration in certain classes of cases and under certain circumstances. *Fourth*:—It will undoubtedly prove the great benefits to be derived from the employment of the skilled anesthetist, and establish him where he belongs in the front ranks of the specialists of our profession. *Fifth*:—It will revise to a surprising degree our present statistics, and hold up to the public gaze the real seriousness and great importance of this subject. It will get at the facts, and bring us all to the realization of our sacred obligation to the patient.

DISCUSSION.

Dr. Wm. Hamilton Long, Louisville, Ky.—It is my impression that once shown the advantages of skilled anesthesia the progressive surgeon will have no other kind; and so far as patients are concerned they are even more appreciative of the comfort it assures them as well as the protection it affords. The Louisville City Hospital several years ago adopted a rather revolutionary policy of appointing a number of visiting-anesthetists to supervise the administration of anesthesia in that institution. The plan has worked admirably and has done much to spread the use of expert anesthetists by others in the profession. Its greatest benefit has been a material reduction in the death rate. In England several progressive coroners have forced certain hospitals to adopt this same plan of appointing visiting anesthetists with similarly satisfactory results

Dr. M. Salzer, Cincinnati, Ohio.—Some years ago I collected statistics from various coroners in some of the larger cities of the country and was surprised to find that they showed about the same death-rate as Dr. Sanders' calculation, viz., one to one thousand. In the course of ten year periods these coroners' statistics remained just about the same, indicating rather conclusively that anesthetic fatalities are a fixed certainty. These statistics are no doubt about as accurate as can be arrived at as a comparison with the anesthetic mortality in certain hospitals doing about 65 per cent. of the surgery in a given community show a rate of one anestheic death to eight hundred administrations. I had intended incorporating my statistics in a paper with names, dates and details, but was disuaded by surgeon friends who pointed out that an unfair impression would be created in that some communities enforced the reporting of anesthetic fatalities while others did not. A great deal of benefit would result if all coroners made it compulsory to report anesthetic and operative fatalities and if all concerned would honestly strive to clear-up the nature of post-operative deaths in their mortality statistics. One fact is of striking interest and that is this. Many institutions using internes as anesthetists and pursuing the policy of using them as anesthetists immediately on their entrance, show a decided anesthetic death rate at the periods of changing service. Such institutions should change their policy and use internes as anesthetists at the end of their interneships and then only after proper instruction and under supervision at the start.

Dr. Orval J. Cunningham, Kansas City, Kan.—The average anesthetic death-rate is a great deal lower than anyone cares to admit. There is scarcely a community in the country that cannot record its anesthetic death, and in many of these there have certainly not been over two hundred and fifty operations. I am inclined to place the death rate at less than one in five hundred. It would seem important also to reiterate again and again that although the immediate risk of death is almost negligible with expert anesthesia, there are still entirely too many postoperative deaths from remote causes that are avoidable. Acidosis, intestinal paresis, reduced phagacytosis, pnuemonitis, cardiac dilatation and other postoperative complications have opened our eyes to the fact that an operation may be most successful but that the patient may die just the same, much to the chagrin of all concerned. While the chapters on these complications have been written into the literature of surgery and anesthesia, they remain to be introduced into the surgical and anesthetic regime of many clinics. Frequently patients who have experienced the beneficence of expert anesthesia will accomplish much in advertising its advantages to their friends and thus public opinion has in many instances been responsible for progress in obviating anesthetic fatalities when surgical opinion took no interest in the matter.

Dr. Ben Morgan, Chicago, Ill.—Clear-cut anesthetic deaths do occur in many hospitals and are almost invariably due to incompetence or carelessness. Locally, where experts in anesthesia are not used extensively and most anesthesias are given by nonmedical persons, the death-rate is high in comparison with the number of operations performed. But the actual deaths are incomparably small in proportion to the number of avoidable postoperative deaths from complications that are the direct result of poor anesthesia. Unfortunately too many surgeons are still content to submit their patients to haphazard methods of anesthesia and unskilled anesthetists, not realizing that with the cooperation of a specialist in anesthesia, delay and complications can be avoided, and the moment of beginning an uneventful recovery can practically be predetermined by the competent surgical team.

Dr. Sanders (Closing).—The information coming back to me from the front is all to the effect that in this maelstrom of war and the overwhelming influx of wounded the thousands of surgeons who are working in the evacuation and base hospitals are beginning in some measure to realize the dependence of their surgical work on the specialist in anesthesia who are braving the dangers of the Hun air-raids at their side. When these surgeons return to civil practice they will bring back with them the utter conviction that the specialty of anesthesia has its place at the head of their operating tables and at the bedsides of their most hazardous cases.

131 Eighth Ave. N.

There are several ways in which you can help in organizing your specialty. Make it a point to obtain the applications of several anesthetists for membership in one or other of the several Associations now trying to cover the field. The comradeship and interchange of ideas at the meetings will be recompense sufficient for their effort in attending the meetings. Also it is important for each anesthetist, who has the welfare of the specialty at heart, to see to it that there are enough competent anesthetists in his community to serve all purposes. When expert service is everywhere available and hospitals, surgeons and patients begin to appreciate its value and comfort, the future status of the specialty is assured. Do not imagine for a moment that other anesthetists will cut-in on your practice. On the contrary they will develop that much more new practice for you to share.

FACTORS OF SAFETY IN ABDOMINAL HYSTERECTOMY.*

Donald Guthrie, M. D.
Surgeon to Robert Packer Hospital.
Sayre, Pa.

The modern methods of preparing patients for operation, the improvement in the operative technic and anesthesia, and intelligent postoperative care, have made the operation of abdominal hysterectomy a safe procedure. In reviewing our 551 hysterectomies of all types performed in the last seven and one-half years, we are impressed with the following factors of safety:

PREPARATION OF THE PATIENT.

First: The preparation of the patient. It is important for the surgeon to know the exact physical condition of every patient presenting herself for operation. This necessitates careful history taking, careful examination of the chest, the circulation, the condition of the blood stream, the nervous system, and kidney efficiency. Patients who have suffered severe loss of blood at the menstrual time we believe should be operated upon just before the onset of the next period, giving the body a chance to recover from the last severe hemorrhage. Women with severe metorrhagia, flowing at the time of examination, should be given salines, and tonics, and such measures should be carried out that will tend to stop the hemorrhage and give the body a chance to recuperate. If the hemoglobin is reduced below 40 per cent. and the bleeding cannot be controlled, direct transfusion of blood from some blood relation is a valuable aid in the preparation as was borne out in five of our cases. I am satisfied these patients could not have stood operation had not transfusion been performed.

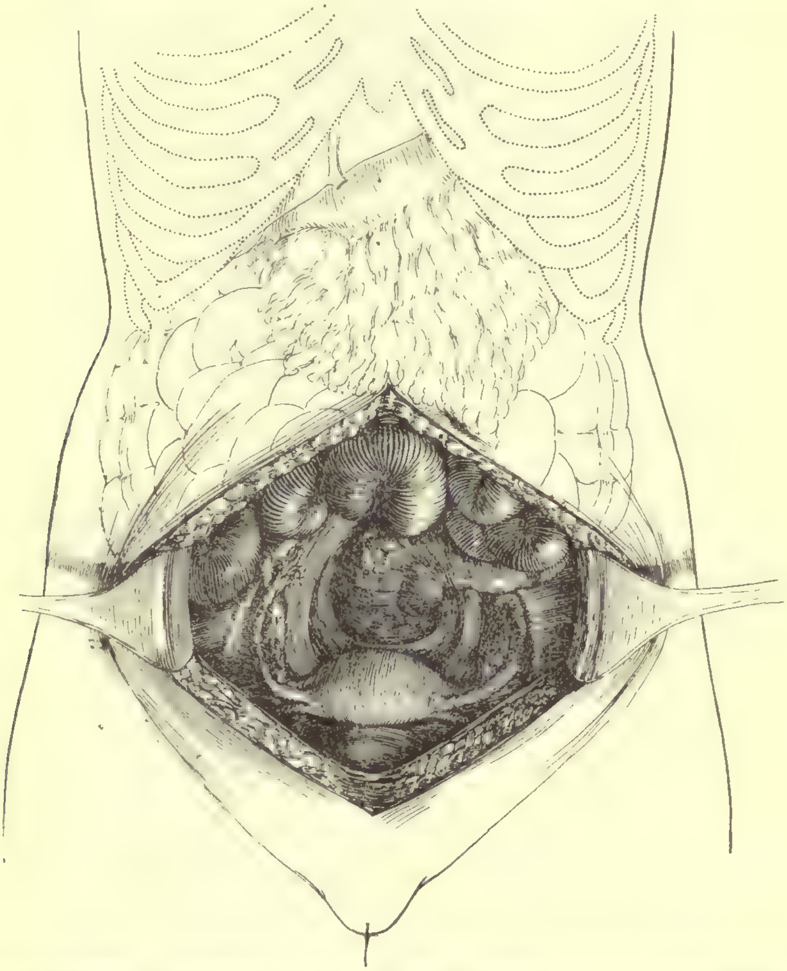

Fig. 1.—Trendelenburg Anesthesia. Showing the coils of small intestine gravitated out of the pelvis when the patient is anesthetized in the Trendelenburg position.

Two factors which promote postoperative shock are *loss of sleep* and *dehydration.* In our preparation of patients for any abdominal operation we consider these two factors carefully. In nervous excitable cases with insomnia we advise a few days' rest in the hospital, and are careful to see that these patients sleep well at night.

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*Read before the Joint Session of the Interstate Association of Anesthetists and the Indiana State Medical Association, Hotel Claypool, Indianapolis, Ind., Sept. 25-27, 1918.

We do not employ preoperative purgation in any form, believing that it is not only a useless measure, but a harmful one. Large amounts of fluid are lost by the purge and a night which should be spent in comfort and rest is made a veritable nightmare. Alvarez and Taylor have shown experimentally that the purged gut is less able to empty itself and is more distended than one that has not been purged. All surgeons have noticed how much easier it is to operate upon the emergency case with the collapsed bowel than upon those who have been thoroughly prepared with their empty but distended coils, and yet, we all have been slow to realize that purgation is not only unnecessary but harmful.

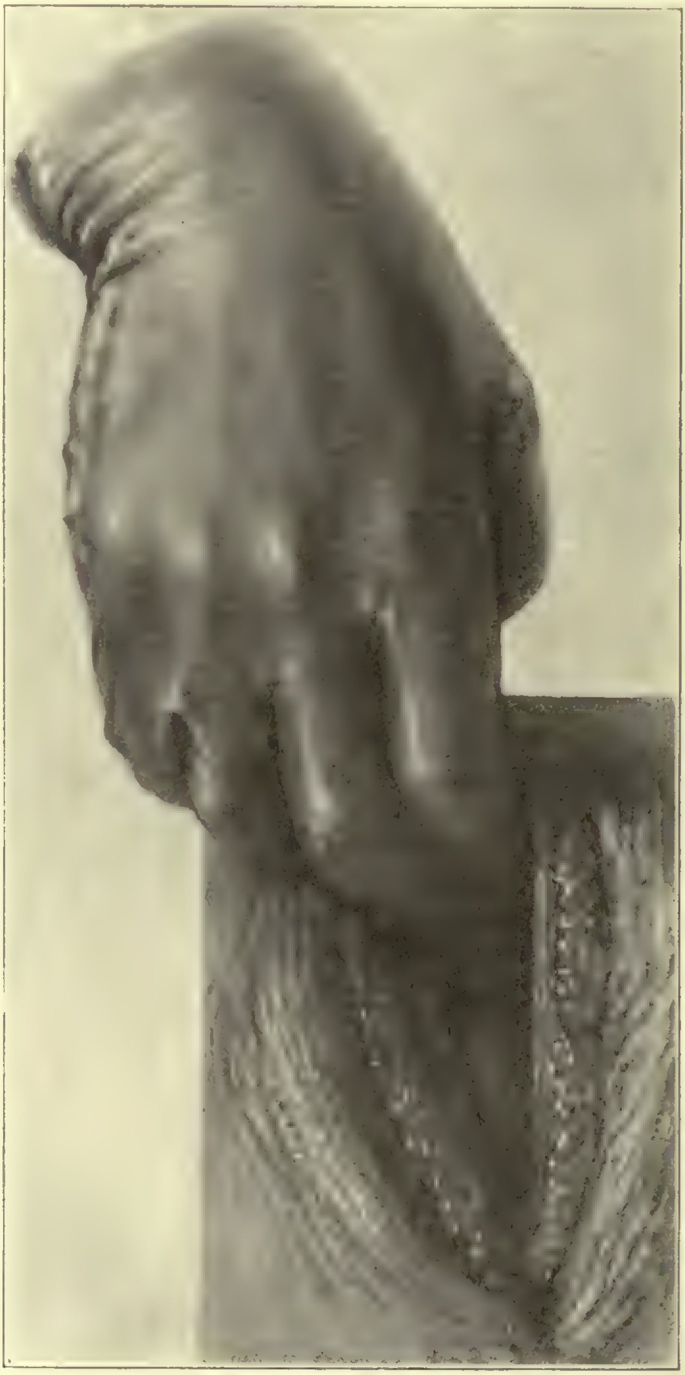

Fig. 2.—Lifting up abdominal wall to free pelvis of any coil of small intestine.

We rely upon a morning enema to empty the lower bowel, except in the patient who is obstinately constipated. She is given a small dose of cascara the night before operation and the morning enema. If the operation does not come until late in the morning we allow our patients hot coffee, tea, or broth when they are awakened.

We plan to have the patients lose as little fluid as possible on the operating table; therefore, our operating rooms are at normal room temperature instead of excessively hot. The patients are not wrapped in blankets, and no measures are taken to keep the operating table warm. It is seldom necessary to change the patient's night garment on the table after the operation is over because of perspiration.

In all cases of hysterectomy the patients are shaved in the afternoon and the abdomen treated with tincture of iodin. This is repeated just before operation. In addition the vagina is washed out well with soap and water, and a 1 to 5,000 bichlorid douche given. This is repeated on the table should the case be one for complete hysterectomy.

SKILLED ANESTHETIST AND TRENDELENBURG ANESTHESIA.

The value of good anesthesia by a trained anesthetist cannot be too strongly advised. The responsibility of the anesthetist in major operations is next to that of the surgeon. Most hospitals today have the services of skilled anesthetists. The personality of the anesthetist is most important, for he or she can by skilled suggestion calm the most nervous patient. In all of our cases of pelvic surgery we employ the Trendelenburg anesthesia. The anesthetic is started with the patient in the Trendelenburg position on the operating table. It is not necessary to have all patients come to the operating room, but if the anesthetic is given in an anesthetizing room the patient is put to sleep in the Trendelenburg position on the table which is to be used during the opera-

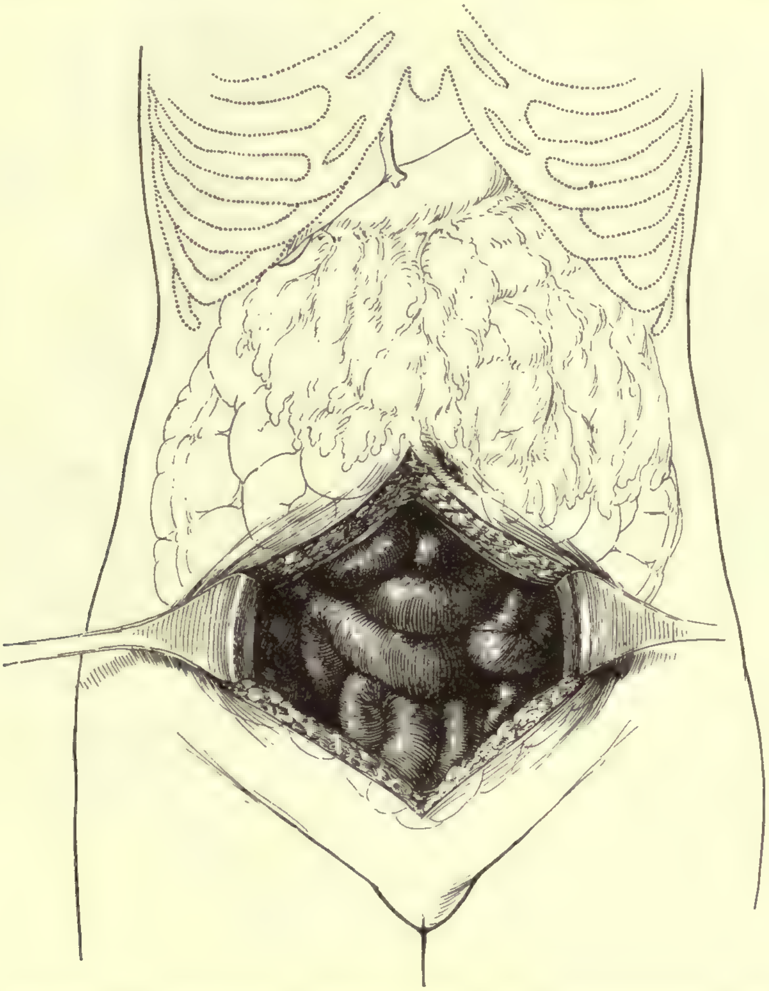

Fig. 3.—Compare the difference in the amount of small intestine in the pelvis when the patient is anesthetized in the dorsal position.

tion. Here, the personality of the anesthetist is most important, for by suggestion the fears of the patient caused by the slight discomfort in beginning the anesthetic in this position, can be allayed.

We all know that trauma to the small intestine is a great factor in the production of shock. In this type of anesthesia it is planned to have the small intestine out of the pelvis when the abdomen is opened. If Trendelenburg anesthesia is used it is usual to find but a coil or two of small intestine in the pelvis, and it is seldom ever necessary to use more than one small square of gauze to get excellent exposure (Fig. 1). When we open the peritoneum we insert two fingers into the abdomen and lift the abdominal walls well up (Fig. 2) the inrushing air will cause any coil of intestine that has not gravitated out of the pelvis to slide upward. When this method is compared with the one usually employed, of putting the patient to sleep in the dorsal position, making the incision, then calling for the Trendelenburg position, it is amazing to see the difference in the amount of gauze used to obtain exposure (Fig. 3). Trauma to the small intestine varies with the amount of packing necessary. We consider this method one of the safe factors in preventing shock in pelvic operations. Should the pelvis not be infected the gallbladder is explored by touch before packing is inserted. If gallstones are found the question as to whether or not they should be attended to depends upon the condition of the patient at the end of the pelvic operation. The appendix is always removed after hysterectomy unless some critical state of the patient contraindicates its removal.

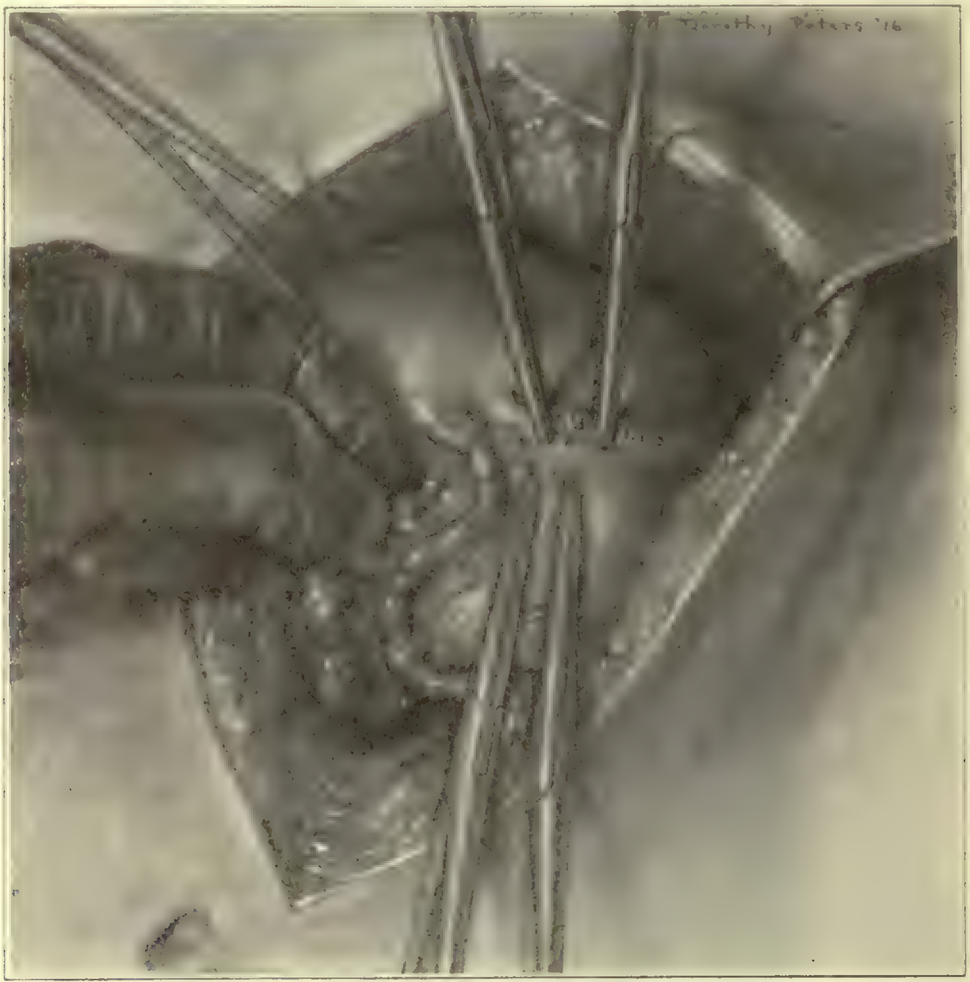

Fig. 4.—Forceps applied to broad ligaments, including ovarian arteries, and forceps placed on round ligaments.

THE SURGICAL TECHNIC.

In our operation for abdominal hysterectomy we use the clamp method, clamping and cutting first the broad ligaments containing the ovarian arteries on both sides, next the round ligaments separately (Fig. 4). After freeing the uterus on both sides in this manner we dissect the fold of the peritoneum on the anterior surface of the uterus, push the bladder forward, then isolate the uterine vessels on both sides and cut between the clamps (Fig. 5). The cervical canal is wiped off with gauze wet in bichlorid. We do not use any strong antiseptic here, fearing that if a slough is produced it may favor intestinal adhesions. In two of our earlier cases the patients had to be operated on for this condition. The objection some few men have to the clamp operaion is the fear that it produces thrombosis in the veins. This I do not believe because the results in vaginal hysterectomies where clamps were used are good, and pulmonary embolism is not any more common in this class of work than in any other. Our sutures are placed well behind the clamps and are placed in immediately so that if thrombosis has occurred it would be in the vessel at the distal side of the ligature. We do not use mass ligatures of any kind nor do we use the old pedicle needle. The vessels in the broad ligaments are secured by using a safety tie, then a lock suture throughout. The uterine vessels are ligated after fixing the ligature along the side of the cervix by a safety tie and then securing the vessels firmly by another tie of the same ligature (Fig. 6).

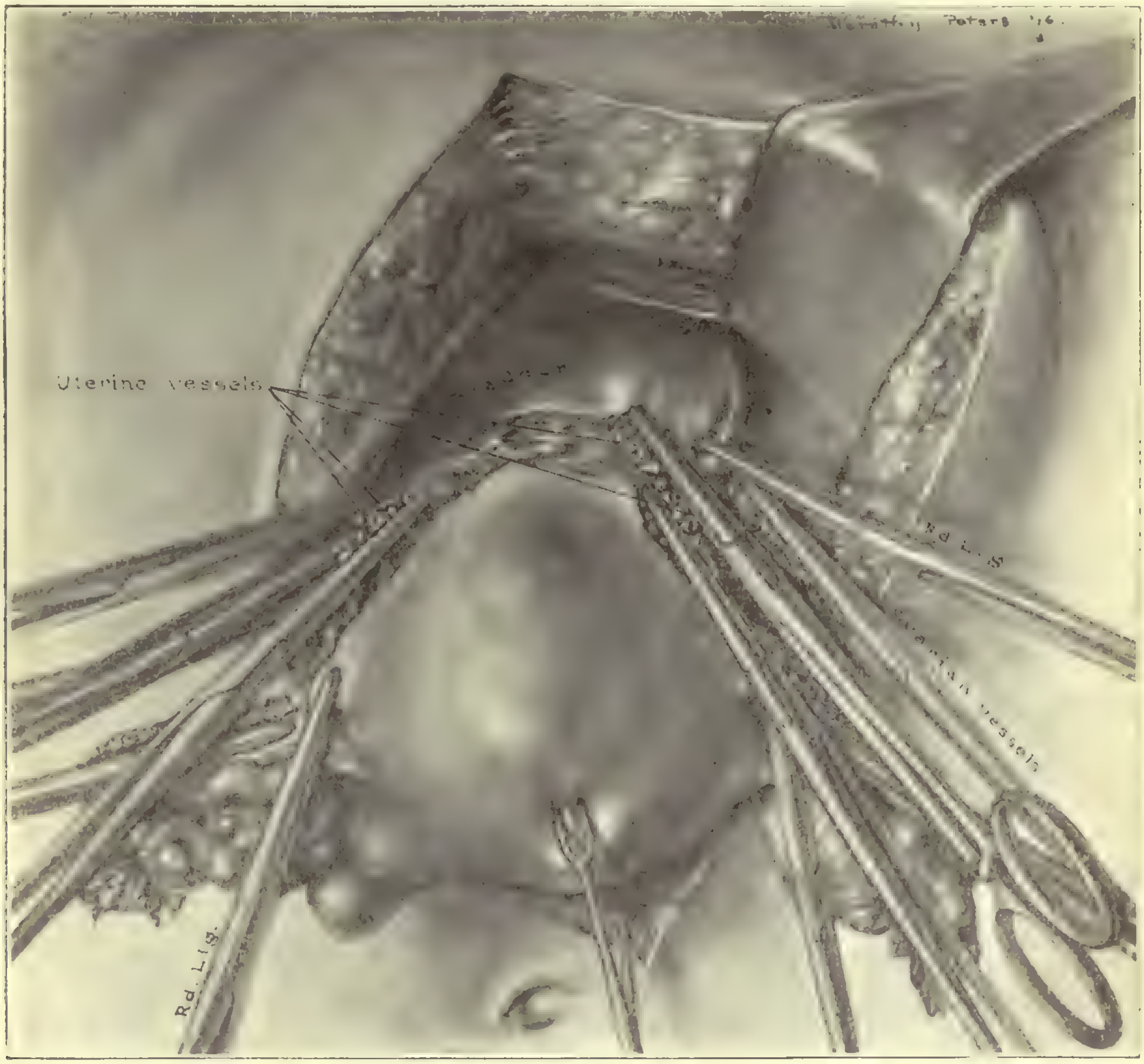

Fig. 5.—Showing uterus freed on all sides. Clamps on uterine vessels. Bladder pushed forward.

If a panhysterectomy is to be performed we isolate the ureters by splitting the posterior peritoneum, following them throughout their course. In a few cases we have used the ureteral catheter passed in the ureter and left in place. This makes it easy to recognize these structures, as they pass close to the cervix. To my knowledge we have never cut or ligated a ureter in a panhysterectomy. In cutting across the body of the cervix we use a conical incision which favors coaptation of the cervical margins. It is most important, I believe, to close up the cervix carefully, and to bring back the anterior peritoneal fold sutured to the posterior peritoneum (Fig. 6). In multiparous women with relaxed vaginal outlets we suture the round ligaments across the cervical body to prevent prolapse of the cervix into the vagina. An equal pull from each side tends to hold the cervix well up in the vagina (Fig. 7). Before closing the abdomen we bring the omentum down into the pelvis, completely covering the operative field, and all coils of the small intestine, which have gravitated back in the pelvis. By so doing, the liability for adhesions is lessened. In the closure of our wounds we use a continuous stitch in the peritoneum and interrupted sutures of chromic catgut in the muscle and fascia. This is a safer method than a continuous stitch. These sutures are not tied tightly.

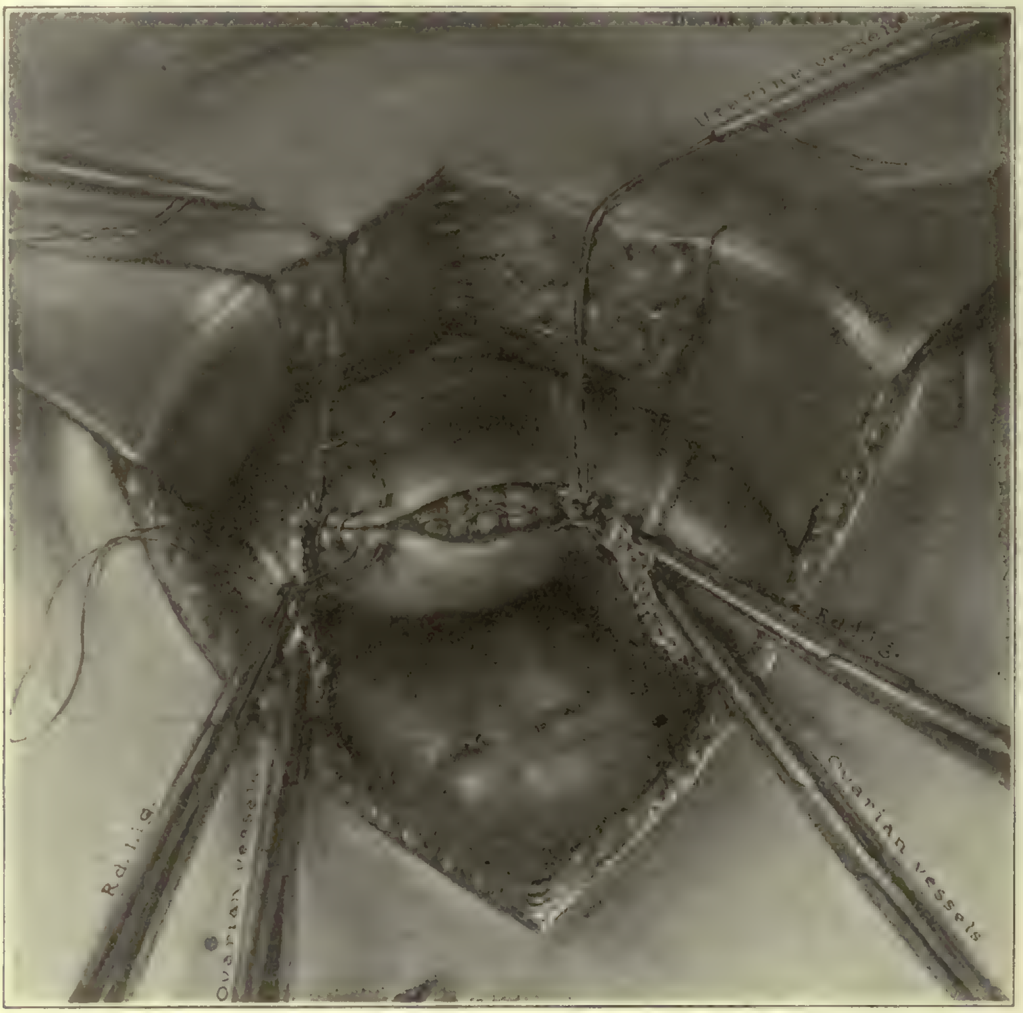

Fig. 6.—Method of securing vessels in broad ligament. Stump of cervix closed and peritoneal folds carefully coaptated.

POSTOPERATIVE CARE.

I cannot advise too strongly that the operating surgeon see his patients daily, and at frequent intervals after operation. The responsibility of the postoperative care of patients should not be entrusted entirely to the house doctors and nurses. Oftentimes complications may be early recognized by the surgeon and combatted, which would be overlooked by subordinates if they had complete care of the patient.

We plan to have our patients made just as comfortable as possible during their postoperative course. They are kept in quiet recovery rooms for the first two or three days in the constant charge of a nurse. As soon as they are awakened they are given by mouth an ounce of olive oil. If they vomit it they get rid of a lot of ether, and it is usually the only time they do vomit. Fluids by mouth are given early and in large amounts if they are retained. We have discontinued the Murphy drip except for those who are dehydrated and shocked, believing that it causes reverse peristalsis and increases gas pain. Instead we use a large rectal tube left in place for forty-eight hours. Food is given early because it is the best stimulant for peristalsis that we have. Most of our cases of hysterectomy have soft diet on the second day after operation and have a natural bowel movement on the third day.

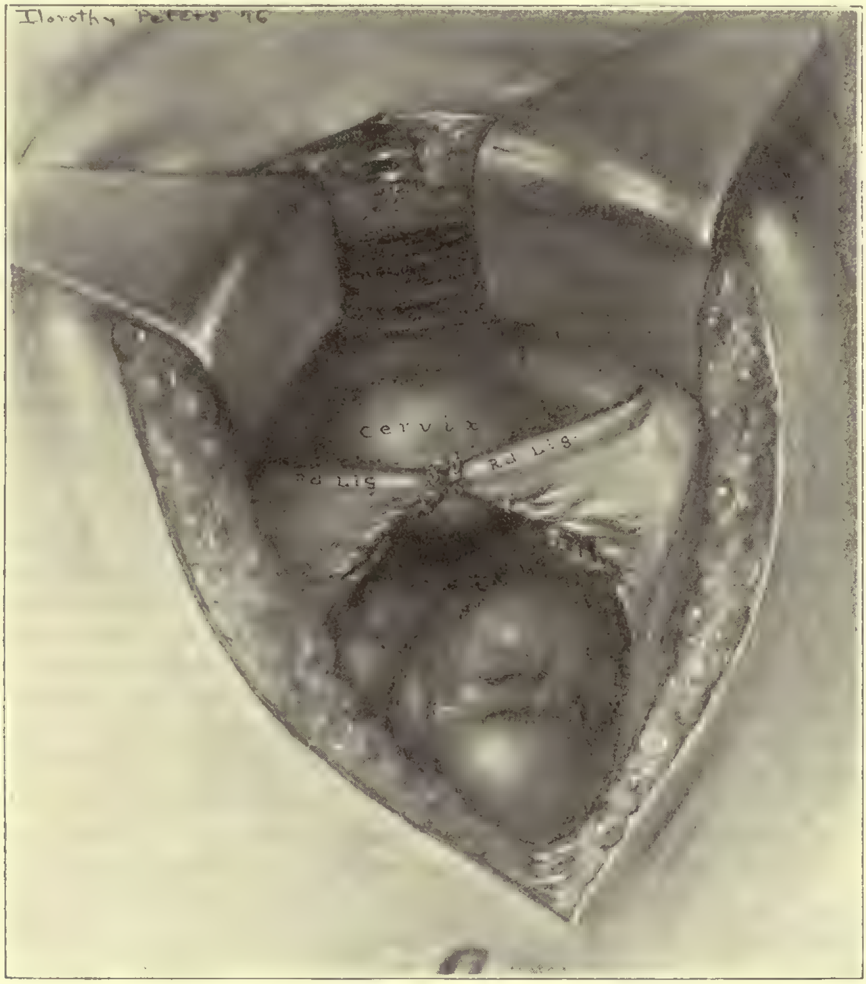

Fig 7.—Showing the round ligaments sutured to cervical stump to prevent prolapse of cervix vagina.

We give 1-6 grain of morphin and 1-150 grain of atropin twenty minutes before anesthesia. Morphin is given frequently but in small amounts for the first forty-eight hours after operation. Our practice is to give 1-12 grain hypodermically every four hours. When the abdomen has not been drained we use a five-pound sand bag for the first three days believing that its weight helps to restore normal intraabdominal pressure and prevents distention. One condition that we watch closely is the postoperative atony of the stomach, which in some cases if not recognized is a precursor of acute dilatation of the stomach, or acute gastromesenteric ileus. Any patient who has regurgitation or vomiting on the second day, or one who is restless, worried, or somewhat distended, has a lavage performed. If there is any tendency at all to acute dilatation, the stomach is washed out every three hours with good hot tap water. We employ all other means possible for retention of the urine other than the catheter. We fear its use and only resort to it when all other methods fail.

RESULTS.

We have had no postoperative hemorrhages in any of our cases, and I did not see a postoperative hemorrhage in the many hundred cases of hysterectomy that I took care of at Rochester. The lock suture in the broad ligament is certainly a safer method than that of mass ligatures.

Two of our patients developed acute obstruction of the bowels due to a loop of the small intestine becoming adherent to the cervical stump. This occurred when we were using the carbolic acid and alcohol treatment of the cervical stump. It is my belief that sloughing occurred which caused these adhesions. Both of these patients were operated upon early during the obstruction; one recovered and one died. Our plan now is to mop off the cervical stump with a weak bichlorid solution.

In the past seven and one-half years we have performed 551 operations of hysterectomy. Out of this number 374 were supravaginal hysterectomies, 63 were complete or panhysterectomies, and 114 were vaginal hysterectomies. We have had 8 deaths or a mortality of 1.4 per cent.

In the series of 374 supravaginal hysterectomies there were three deaths,—two from acute intestinal obstruction and one from acute dilatation of the stomach.

Among the 114 vaginal hysterectomies there were three deaths,—one from general peritonitis, one from pulmonary embolism two weeks after operation, and one from post-operative ileus.

Of the 63 panhysterectomies there were two deaths,—one from pneumonia and one from peritonitis.

Excluding the one unavoidable death from pulmonary embolism the operative mortality for the series is 1.2 per cent.

NITROUS OXID-OXYGEN ANESTHESIA FOR DIFFICULT EXTRACTIONS.*

H. R. FRANCIS, D.D.S.,
TOLEDO, O.

In the history of dentistry, extraction of teeth is the oldest and most feared dental operation. Still, the average dentist has given less thought and study to anesthesia for the elimination of fear and pain, and the technic of this operation than any other dental procedure. With the rapid advancement in other branches of our work, is it not reasonable to expect that this should receive the same consideration, and be kept astride with progress.

Extraction cases, in many instances, are of the greatest importance, requiring the same consideration as any other surgical procedure, for the reason that success is hoped to produce important curative results and failure may result in great injury to the patient.

The dental surgeon, in his anesthetic practice, is at a great disadvantage in many respects as compared with the surgeon. As the majority of extraction cases are of the nature of emergency operations, the anesthetic must be more or less of a corresponding character, therefore, he is often called upon to administer anesthetics in the absence of any previous preparation of the patient, being forced to place his reliance wholly upon the anesthetic agent, supplemental as far as possible by the application of suggestion and his skill in administration.

In selecting an anesthetic agent for extraction operations, it should be one that will produce anesthesia in a reasonably short time, insure a rapid recovery following its withdrawal, and exert no harmful effects upon the vital centers and organs of the body. In nitrous oxid-oxygen, we have an agent which fulfills these requirements. Being practically non-toxic and non-irritating, it is possible to administer it with comparative safety to patients with diseased organisms without increasing the pathological conditions. It is the safest and most flexible anesthetic in the hands of a skilled operator, and history has proven that nitrous oxid alone has been remarkably safe employed by even the inexperienced. It has been condemned mainly by those who are pessimistic of all things progressive, and those men whose entire instruction was obtained from the salesman who sold them a gas apparatus.

There have been numerous and varied developments of anesthetic agents since the discovery of nitrous oxid, but the psychic, as well as the pathological conditions govern the employment or enhance the value in many instances, whereas nitrous oxid-oxygen anesthesia is limited practically by the skill of the anesthetist and will reward the efforts made to master its peculiarities with the most universal success and satisfaction.

The essential requirements in the administration of nitrous oxid-oxygen anesthesia consists in the ability of the anesthetist to determine the proper mixture of gases, according to the requirements, also learning to diagnose the various planes of anesthesia, and employing a machine capable of developing the possibilities of this form of narcosis. In the majority of cases anesthesia will be maintained with about 93 per cent. nitrous oxid and 7 per cent. oxygen. However, there is no set rule. We had one case requiring 45 per cent. oxygen. Nitrous oxid is very evanescent in its effects, requiring only a few inhalations one way or the other, to allow a patient to regain consciousness, or to be plunged into a condition of collapse. This explains the necessity of a refined technic.

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*Read during the Fourth Annual Meeting of the Interstate Association of Anesthetists, in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., September 25-27, 1918.

Patients are not all affected in a like manner by anesthetics. Environment, occupation and habits exert governing influences upon the results obtained. The class of patients who tax the skill of the anesthetist are the alcoholics and the extremely nervous. When it is necessary to deal with such patients, the administration of a preanesthetic hypnotic is found very advantageous. We rarely employ hypnotics in the office, however, on account of the short period usually required for the operation, and the long period for recovery.

In extraction operations, we generally operate in a dental chair, and as a good anesthesia will not be maintained with an obstructed air passage, it is very essential that the head is in a correct position, that is, allowing the neck to follow the long axis of the body. If the head be too far back, it allows the saliva to flow back into the throat, causing a desire to swallow, resulting in restlessness during the induction stage, and is usually followed by nausea. If too far forward with chin nearly resting on chest, it will interfere with respiration. Caution also should be exercised against long continued pressure, without interruption, upon the lower jaw while operating.

When the patient is in correct position, and the mouth has been examined, removing all loose dentures, adjust the nasal inhaler with the exhaling valve open. Instruct the patient to breathe through the nose in the usual manner. Allow the gas to flow sufficiently to force it to the inhaler, adjust the mouth prop, and when everything is running smoothly, place rubber cap over the mouth. The flow of gas is gradually increased, and more tension placed on the exhaling valve spring, which forces the blood to take up a greater volume of nitrous oxid. Anesthetics should not be administered too rapidly, at the same time, watchfulness should tell us the different conditions, and allow us to quickly pass over the excitement stage. When ready to operate, the exhaling valve should be screwed down tight, and the pressure of gas from the machine increased sufficiently to compress the gas in the nasal passages and force the soft palate down upon the dorsum of the tongue, preventing the patient from breathing through the mouth. If this is not sufficient, increase the pressure still more and exclude the air by blowing the gas out the mouth, or use the mouth hook. However, a more economical method is to pack the back part of the mouth with gauze. The gauze method is preferable as it also prevents teeth, or parts of teeth, fillings, blood, and debris from going back into the throat and being swallowed, or inspired into the lungs, causing no end of trouble.

There are two general classes of abnormal cases of extraction—the malposed and malformed teeth. We often find a combination of both classs in a single case. In the malposed class are found the impacted third molars and upper cuspids. This type of case is often complicated by some distorted shape of the tooth, caused by force in its attempt to erupt. In the malformed class are the teeth in which stimulation of the peridental membrane, by infection or pressure, has caused an excessive amount of cementum to be deposited on the roots, resulting in an abnormal development or hypercementosis.

The technic for extraction should be divided into two parts. First, loosening the tooth. Second, removing the tooth from the socket. This procedure should be followed in all types of cases, from the simplest to the most difficult case. If all teeth were normal in shape and position, very simple technic would be required, but unfortunately their condition can seldom be determined until the tooth is out. We may resort to every device intended to assist us in determining the character of the tooth to be removed, but a great deal of uncertainty usually remains, and it is advisable to follow any plan that may help us to avoid the danger of accident.

The method which I employ for the removal of lower impacted third molars is as follows: With a blunt dissecting instrument, dissect the gum tissue, exposing the bone, then employ a drill in a strong engine at a low speed. Insert it on the buccal side along the axis of the root, remove and insert it again slightly at the side of the first hole made, then connect the two canals. Follow this procedure until the socket is enlarged two-thirds the circumference of the tooth. Insert an elevator and loosen the tooth. If the socket is not large enough to permit of the removal of the tooth, enlarge the socket with a surgical bur, or half-round chisel. With this method, the minimum amount of bone is destroyed. The severity of these cases depends entirely upon the degree and depth at which the tooth is lying, also the density of the surrounding bone.

There are many other types of teeth which present greater problems for their removal than those that are impacted. For instance a lower first or second molar in the mouth of a middle-aged patient. The tooth is very firm to the touch, and there is no soreness. *X*-ray reveals a blind abscess, also hypercementosis of the roots. History: Tooth devitalized twenty or more years before, which means the tooth was devitalized before the texture of the tooth had become dense, and it will be found that it is in the same condition now, only in all those years it has dried out and is exceedingly brittle. There is no peridental membrane remaining. It is like an impacted tooth due to fusion. Such a tooth usually presents an exceedingly difficult problem to remove.

A method for removing such a tooth is to try to luxate with a molar forcep, which will include the body of the tooth between its beaks. If this is not possible, the next step is to separate the roots. For this, I employ a pointed elevator, introducing it at the gingival between the roots, and by a slow rotary movement, force it inward and downward. This removes the septum of bone between the roots, and occasionally one or the other of the roots will be loosened. If, however, neither root is loosened, introduce a flat wedge-shaped elevator between the distal root and molar, slowly working it downward, forcing the root into the space made by the pointed elevator, then repeat the method on the mesial root. Great care must be exercised not to encroach upon the teeth not to be extracted.

In conclusion, I would urge anyone in doubt to improve his technic and knowledge of application, for the object after all in our life work, is service—the best we can do for our general uplift, and for the good of humanity, whom we have the honor to serve.

THE SPECIALTY OF ANESTHESIA IS BEGINNING TO COME INTO ITS OWN. A NUMBER OF ASSOCIATIONS OF ANESTHETISTS HAVE BEEN ORGANIZED; AN OFFICIAL ORGAN HAS BEEN ESTABLISHED FOR THE PUBLICATION OF THEIR TRANSACTIONS AND A YEAR-BOOK HAS BEEN FOUNDED TO COLLATE AND PRESERVE ALL WORTH-WHILE RESEARCHES AND CLINICAL PROGRESS IN PERMANENT FORM. THE QUESTION NOW IS WHAT ARE YOU DOING TO MAKE THESE VITAL ADJUNCTS OF YOUR SPECIALTY A SUCCESS? ARE YOU BRINGING NEW MEMBERS INTO YOUR ASSOCIATIONS OF ANESTHETISTS? ARE YOU PREPARING PAPERS FOR THEIR PROGRAMS? ARE YOU PURSUING ANY RESEARCHES IN THE SCIENCE OR ART OF ANESTHESIA? IF NOT WHY NOT? YOUR SPECIALTY NEEDS YOUR CO-OPERATION.

ANESTHESIA AT THE FRONT

RAPID INDUCTION ANESTHESIA FOR MILITARY SURGERY.

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INDIANAPOLIS, IND.

The following is an E-C-E Sequence (ethyl chloride, chloroform, ether), by the closed method. The idea is taken from the DePage mixture used in the French clinics, but the formula has been modified. It is of value for the rapid induction of all ether anesthesia and is of especial value as an anesthetic for short operations and the dressing of painful wounds. From the initial application a period of operative anesthesia, lasting from 12 to 20 minutes is obtained. Induction for operation is completed in about 2 minutes.

This report is based upon observations of about 2,000 anesthesias.

MIXTURE.

The modified formula of the mixture is as follows:

One dose

Ether	24 cc.
Chloroform	½ cc.
Ethyl chlorid	5½ cc.
Oil of Orange	⅛ cc.

While the oil of orange is not essential, it serves to render the application of the mixture more pleasant to the patient and this consideration is appreciated. It has been our custom to make up this mixture in four ounce quantities, thus:

Four ounce mixture.

Ether	96 cc.
Chloroform	2 cc.
Ethyl chlorid	22 cc.
Oil of Orange	½ cc.

One ounce of this mixture is the usual dose. Debilitated soldiers required the administration of but ¾ of an ounce, while an occasional robust subject needed 1¼ ounces.

This mixture is stable for 3 or 4 days if kept tightly corked. Care must be used in its mixing and handling as the extreme volatility of the ethyl chlorid causes it to leave the mixture very readily. It should be stored in a cool place.

HOOD OR MASK.

The hood, used for the administration of this mixture, was made as follows: A circle of rubber sheeting was cut to the diameter of 20 to 22 inches. An elastic, purse-string was strung through the faced edge of this circle. This elastic was approximately 15 inches long. The general effect on completion was that of a large bathing or dusting cap. A ventilating hole ½ inch in diameter was cut in the center of the hood. In this hood was placed a gauze-covered cotton pad about ½ inch thick and some 6 to 8 inches square.

METHOD OF APPLICATION.

With the cotton pad resting flat in the upturned hood, one ounce of the mixture is poured at once over the pad and the hood is immediately placed over the patient's face, the elastic purse-string stretching around the crown of the head and encircling the chin. This allows the saturated pad to fall close to the face of the patient. It should be lifted up immediately by being grasped through the rubber sheeting and held away a slight distance to lessen the pungency of the concentrated vapor.

ACTION OF THE MIXTURE.

The action of the mixture must now be remembered. The ethyl chlorid will first leave the uplifted pad, filling the space within the hood with its vapor. This is sufficiently potent to produce complete ethyl chlorid narcosis. As the ether vapor will not leave the uplifted pad in sufficient concentration to produce ether anesthesia before the effects of the ethyl chlorid have vanished, the pad is lowered so that the mixture is directly over the nose and mouth of the patient, forcing the patient to breathe through the saturated area, thereby drawing out the ether vapor in sufficient concentration and quantity to produce ether anesthesia before the patient emerges from the ethyl chlorid narcosis. The hood is left in this position throughout the induction or operation, the jaw of the patient being supported, if neccessary.

Although there is very little chloroform in the mixture, its presence is sufficient to prolong the ethyl chlorid effect until the ether has had time to act fully. Results with ethyl chlorid-ether mixtures without chloroform were not satisfactory and the mixture, herewith presented, contains the smallest quantity of chloroform commensurate with good results.

THE PATIENT'S RESPONSE.

The patient, at first, is apt to be frightened by the procedure, but not to any great extent. If he be directed to take *short* breaths he will experience no unpleasantness during the brief interval before unconsciousness supervenes. If his first breath is a long one the pungency of the mixture will be slightly disagreeable. The average stage of excitement is far shorter than that occurring with straight etherization. After a patient has once been anesthetized with the mixture there is no excitement stage during other administrations. Some patients have taken this form of anesthesia on as many as 15 consecutive days for painful dressings, without untoward effect. In most instances patients have insisted upon having this anesthesia for the subsequent dressings of their painful wounds.

Any effects, aside from those directly traceable to etherization itself, have been negligible. Patients, who had eaten within an hour preceding anesthesia, would frequently vomit.

ANESTHETIC POINTERS.

In the application of this rapid induction method of anesthesia for military surgery, it is the action of the ethyl chlorid content of the mixture that must be understood.

Ethyl chlorid, in overdose, produces either (a) pharyngolaryngeal spasm, which if the overdose be continued will proceed to respiratory obstruction or (b) a slower depression of respiration from the anesthetic effect on the central nervous system. Crowing inspiration is the warning of pharyngolaryngeal spasm, and fortunately its onset is gradual. The hood need not be removed at the earliest manifestations of this spasm as it often occurs with this method with the given dose of ethyl chlorid, but is of slight intensity. The patient showing such spasm *after consciousness is lost* should be watched and the hood removed if the spasm grows progressively deeper. The spasm, sometimes seen before consciousness is lost, is due to the pungency of the vapor, when the pad has not been lifted from the face quickly enough. It is of no consequence. The true ethyl chlorid spasm occurs only from overdose and is never manifested until after consciousness has been lost.

In this recorded series of some 2,000 administrations it was deemed necessary to remove the hood, on account of spasm, only on three occasions. In these three instances anesthesia was continued with straight ether.

Progressive depression of respiration, from the central effect of the anesthetic, is easily detected because of its progressive character and there is ample time for the removal of the hood and withdrawal of the anesthetic mixture before respiration ceases altogether. Respiration will cease most certainly if the overdose is continued. But as ethyl chlorid seems to have no effect on the cardio-vascular system, even though depression should go on to complete cessation of respiration, there is no need for alarm. The condition may be likened to respiratory paralysis under ether, except that it is much less serious and can be more easily handled. Ethyl chlorid is so rapidly eliminated that from one to five movements of artificial respiration serve to carry the overdose away from the medulla and re-establish normal breathing.

In the 2,000 recorded administrations of this mixture it was deemed necessary to remove the hood and withdraw the anesthetic in two instances because of this depression of respiration. On no occasion did respiration cease completely. In my own experience I have not observed that spasm and depression occur in the same individual. Apparently they are different reactions and just why one patient should show spasm as a result of overdose and another respiratory depression, is still inexplicable. However the fact remain.

Also in my own observation one case of depression was noted to every ten cases of spasm. This ratio of untoward symptoms held good for the entire series.

These observations on the action of ethyl chlorid are based, not on the method of mixed induction anesthesia, as herewith described, but on studies of ethyl chlorid, *per se,* as a general anesthetic. The untoward symptoms are included, not because these symptoms are frequently noticed during induction, but simply to counteract the faulty impressions generally prevalent regarding the dangers of ethyl chlorid, due to lack of acquaintance with its action and effect. It is in no wise so treacherous nor toxic as chloroform.

FURTHER CONSIDERATIONS.

As already stated the anesthesia with this method is induced in the average time of 2 minutes or less and the initial application affords an available period of from 12 to 20 minutes of operative anesthesia.

In some cases the ventilator opening in the top of the hood is insufficient to prevent the cyanosis of rebreathing, in which instances the edge of the hood is lifted, from time to time, from the face to admit fresh air. Cyanosis is not at all necessary to the success of the method nor is it to be tolerated.

This method is a great time saver in inducing other anesthesia either by the open-drop or semi-closed method of administration. Two minutes after the hood is supplied the operation may be started. The hood is preferably removed in from 6 to 8 minutes for the change to straight ether. At this time the narcosis from the rapid induction mixture is deepest.

It is necessary to watch the patient closely for the first 3 minutes following the application of the hood, as it is during this period that the ethyl chlorid in the mixture is active. After 3 minutes the effect of this agent is negligible and the patient is practically subject only to straight ether anesthesia by the closed method.

If the pad is not raised immediately after the hood is applied, there will be some breath holding, and if the patient takes a long, deep breath at first, even if the pad has been raised, breath holding may also result.

If the pad is not lowered to the face as soon as the ethyl chlorid narcosis supervenes bringing a concentrated ether vapor into effect, the potency of the ethyl chlorid may vanish while the patient is in the excitement stage of etherization, in which case there may be some resistance and struggling.

Owing to the exigencies of circumstances the anesthesias upon which this report is based, were given in the rush of war surgery, during periods of intense activity, mostly by nurses and hospital orderlies, who had had no previous training in anesthesia. They were working under my direct supervision.

3902 N. CAPITOL AVE.

THE ADMINISTRATION OF ANESTHETICS TO SOLDIERS—AN ETHYL CHLORID-ETHER VAPOR METHOD.

ARTHUR MILLS, M.D.
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Since the beginning of the war I have had considerable experience in the administration of anesthetics to soldiers in this country—in the first instance, to soldiers in a war hospital suffering from wounds and invalided home from the fronts, and latterly to young soldiers in full training admitted to a camp military hospital to undergo some operation. The two classes really differ considerably as regards type. The large majority of the former have been confined to bed for at least a few days, and are *invalids,* and differ very little, as regards my subject, from the usual type of hospital patient in civil life. At the camp military hospital, on the other hand, we are constantly meeting with the young, athletic, well developed man of 18 to 21 years of age engaged in a period of intensive physical training. Frequently the operation is a trivial one, and admission to hospital the day previous to the operation is considered sufficient for the purposes of pre-operative preparation. The nervous system of the young soldier is by no means stable. He is frequently far more *nervous* than a woman. His reflexes are exquisitely sensitive. He is in hard muscular condition. He is nearly always a heavy cigarette smoker. We have thus many factors which go to make up a type difficult to anesthetize safely and satisfactorily.

It must at once be laid down in the most emphatic manner that for such cases induction of anesthesia with chloroform is strongly contraindicated. Should the attempt be made to anesthetize with chloroform, it will be found

(*Continued on page 62.*)

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APRIL EDITORIALS. 1919

THE IMPORTANCE OF BLOOD PRESSURE OBSERVATIONS IN SURGICAL PROGNOSIS.

Speaking before the Providence Medical Association, Albert H. Miller, the noted anesthetist, again emphasized the fact that the blood pressure is the most valuable single means at our disposal for making a preoperative prognosis and for judging the condition of the patient during and after operation. It may uncover arterio-sclerosis, nephritis, myocarditis, aortic insufficiency, or mitral stenosis. It registers the ability to withstand hemorrhage, the depression of the anesthetic and surgical shock.

In his reprint from the *Boston Medical and Surgical Journal,* January 2, 1919, Miller contends that, in the present advanced state of surgical knowledge, the patient has a right to expect a fairly exact preoperative diagnosis and a very exact preoperative prognosis. The surgeon who makes and records a prognosis before each operation and checks up his preoperative opinion with the result will rapidly gain in skill in this important department.

Miller classifies his cases into good, fair and poor risks. Good risks,—patients free from organic disease, whose surgical condition is not likely to prove fatal,—are expected to recover. If a fatality occurs in this class of patients, the case should be carefully gone over to determine if the preoperative prognosis was in error or the work of the surgical team to blame for the fatality. In fair risks,—patients suffering from organic disease, but whose surgical condition is not specially serious, if no examination and no prognosis has been made, the necessity for a lame explanation of a fatality,—for instance fatal diabetic coma after appendectomy,—is most deplorable. In poor risks,—patients whose surgical condition is so serious or so far advanced as likely to result in fatality, recovery may be unlikely without operation, and the prospect of death should be anticipated by due warning.

In a series of 1,000 consecutive operations, studied under this classification, Miller found the following results:

	Class 1	Class 2	Class 3	Total
Cases	734	179	87	1000
Deaths	2	14	29	45
Percentage	.27	7.82	33.33	4.5

The deaths recorded occurred in from 24 hours to 3 weeks after operation. No deaths took place during or immediately following operation. Measured method of anesthesia were used by Miller exclusively.

To determine the accuracy of Moots' rule:—that if the pressure ratio (representing the relationship existing between the kinetic energy expended by the cardiac contraction in moving the blood column and the potential energy stored in the arterial walls and columns of blood which they contain), lies between 25 and 75 per cent., the case is probably operable, if outside these limits, probably inoperable,—Miller investigated his series of 1,000 cases and tabulated the results. According to Moots' rule 3.23 per cent. of the operable cases died and 96.77 per cent. recovered. Of the inoperable cases 23.07 per cent. died and 76.93 per cent. recovered. Some of the cases classed as inoperable underwent minor operations safely, and some of those classed as operable died after very serious operations and under circumstances which could not have been readily predicted. On an average, Miller believes that his results show the great value of Moots' rule in surgical prognosis.

McKesson's rule:—that after a half-hour of sustained low blood pressure and rapid pulse, almost every patient succumbs either shortly or within three days of surgical shock and heart exhaustion,—was put to a similar test. In a considerable number of cases shock (characterized by a diastolic pressure of 80 mm. or less, a pulse pressure of 20 mm. or less and a pulse rate of 120 or more), was reported by Miller to his surgeons and the operation rapidly completed. All of these patients recovered. Thirteen of the patients were in the danger zone for from 25 to 70 minutes. Of these 9 died, giving a mortality rate of 69.23 per cent. These figures certainly indicate the efficiency and great value of McKesson's rule for determining shock during operation.

Both rules, according to Miller's conclusions, are trustworthy and valuable aids and should be routinely employed.—McM.

ANESTHESIA AT THE FRONT

(*Continued from page 60.*)

that the large majority of these men develop excitement and struggling and spasm of the limbs and respiratory muscles. If at the moment of onset of such a state of spasm a strong chloroform vapor has been inhaled, it may be retained in the pulmonary alveoli for a considerable time, the percentage of chloroform in the circulating blood may be raised to a toxic degree, and fatal symptoms may appear while the corneæ are still sensitive. The heart, indeed, gives way before breathing can be reestablished.

It is exceedingly doubtful, too, whether a mixture of chloroform and ether is safer than pure chloroform during the induction period. The difference in degree of volatility of the two substances forms the difficulty. If any anesthetic effect whatever is to be obtained from the ether element in the mixture, measures must be adopted to exclude the air to some extent, and exclusion of air is not permissible if the chloroform element be present in any degree. Again, if the mixture be administered by anything resembling the constant drop method, or if the successive *doses* poured on the mask be too frequently repeated, we must remember that the proportion of chloroform in the vapor inhaled by the patient is rising to an unknown extent. My experience, indeed, goes to show that the result obtained by induction with a chloroform and ether mixture is the same as that obtained with pure chloroform.

Induction with pure ether, again, is attended in these cases with considerable difficulty. A large proportion of them have a certain degree of pharyngitis from excessive cigarette smoking, and coughing and choking are common phenomena.

Nitrous oxid gas produces too light and evanescent an anesthesia in these robust subjects to form a satisfactory prelude to ether, and any attempt to prolong it by administering more gas results in undesirable cyanosis.

I have come to the conclusion, therefore, that an ethyl chlorid-ether sequence is the best method we can adopt for induction, and have devised a method of using this sequence which I should like to bring to the notice of others.

I do not think that the majority of administrators use ethyl chlorid in the most satisfactory manner. Although we quite realize that it is not the quantity of anesthetic used but strength of vapor inhaled, that is the determining factor in producing anesthesia, I find that in books on the subject, such as Hewitt's and Buxton's, this principle is fully realized when discussing chloroform or ether, but it is thrown aside when treating upon ethyl chlorid. We are told, for example, to give so many cubic centimeters to a child and so many to an adult. This method would be all right so far if we could be sure that the quantity of ethyl chlorid prescribed could always be vaporized in a desired and known quantity of air. We cannot be sure of this. Again, it is impressed upon us in administering chloroform and ether that the patient should be *gradually* put under with a steadily increasing strength of vapor. With the recognized methods of giving ethyl chlorid, on the other hand, there is nothing to prevent the patient getting the full strength of the vapor with his first inhalation, a really dreadful experience for the patient, and associated with considerable danger. For the past five or six years I have constantly used an inhaler for ethyl chlorid devised by Mr. C. J. Loosley, anesthetist, Hospital for Children, Great Ormond Street, and have given many hundreds of administrations, including about 300 to soldiers (early in the war) undergoing dental extractions. To have a stopcock fitted to the foot of the bag and this connected by rubber tubing with an ether bottle and bellows was an easy matter, and this forms the simple apparatus which I now use in giving the ethyl chlorid-ether vapor sequence.

To indicate briefly how the apparatus is used, and quoting freely from Mr. Loosley's description of his inhaler, about 3 c.cm. of ethyl chlorid are sprayed into the bag through the valve. This valve opens when the nozzle of the ethyl chlorid tube is pressed against it, and closes automatically immediately the nozzle is withdrawn, a tube below carrying the discharge well away from the face-piece. The face-piece is applied to the patient's face and the lever of the two-way cock kept in the down position so that the first few breaths of the patient are turned into the bag till it is about half full. The lever is now pulled upwards towards the face-piece and the patient breathes a dilute mixture of ethyl chlorid vapor and air. Dilute ethyl chlorid vapor is quite pleasant to breathe. A vapor sufficiently strong to produce anesthesia is pungent and produces a sense of suffocation. The vapor is now strengthened by spraying a little more ethyl chlorid through the valve, and still a little more until anesthesia is produced. The patient is now, as a rule, breathing vigorously, but there is abundance of air in the bag and he can take a full breath without emptying it.

Using ethyl chlorid alone we can safely push the anesthetic till we have the usual signs, fixed eyeballs, dilated pupils, and insensitive corneæ—before removing the face-piece, and a good minute and a half or more of satisfactory anesthesia without trace of cyanosis will be obtained. Using it in sequence with ether a profound ethyl chlorid effect is not desirable, and as soon as unconsciousness is produced ether vapor may be pumped into the bag by means of the hand bellows. The strength of ether vapor can be varied within any limits by varying the degree of vigor of pumping and by the admission of more or less air at the face-piece. The apparatus is very economical as regards amount of ether used, a certain amount of rebreathing being involved, and, if desired, a much stronger vapor can be obtained than by using a Clover.

I contend that the method is a safe and highly satisfactory one for the induction of anesthesia, especially for the difficult type of patient under consideration, and it is also a satisfactory apparatus to use in maintaining anesthesia in the large majority of operations in a camp hospital.

I think that most administrators will agree that quick inductions and closed inhalers tend to be associated with vigorous respiratory movements. In abdominal cases I therefore prefer a slow induction with chloroform and an open mask, changing to ether and an ether mask and the drop method before the dangerous period of excitement supervenes. Fortunately abdominal cases rarely come to operation while yet in a state of youthful vigor, and thus do not present the difficulties I have been discussing. In conclusion, I am convinced that the previous hypodermic administration of 1-6 gr. morphin and 1-100 gr. atropine is of considerable value. The hypodermic should be given no matter how trivial the operation may be.

Occasionally the nature of the operation demands the use of chloroform, but after the induction period is over and full narcosis has been produced these young soldiers take chloroform well.

THE AMERICAN ASSOCIATION OF ANESTHETISTS WILL HOLD ITS SEVENTH ANNUAL MEETING IN ATLANTIC CITY, N. J., JUNE 9-10, THE FIRST TWO DAYS OF A. M. A. WEEK. LIEUT. COMMANDER WM. SEAMAN BAINBRIDGE, M.C., U. S. N., WILL SPEAK AT THE ANNUAL DINNER OF "SOME SURGICAL LESSONS OF THE WAR," AND ILLUSTRATE HIS TALK WITH SLIDES AND FILMS TAKEN IN THE SERVICE.

THE FIELD OF LOCAL ANESTHESIA IN A WAR HOSPITAL.

Louis J. Hirschman, Major M.C., U.S.A.
DETROIT, MICHIGAN.

Among the many interesting surgical methods revived and elaborated through the stress of military needs, the employment of local anesthesia has been of great value in the surgery performed in a military hospital.

Base Hospital 17, Harper Hospital unit of Detroit, was located in a city of 130,000 inhabitants. This city was a great railroad center and was on the direct line traversed by many of the American Expeditionary Forces in going to and from the front. Many thousand troops were encamped in the vicinity of this hospital, and among those freshly arrived from the U. S. A., it was not all infrequent to find cases of hernia, rectal diseases, abscesses and other conditions met with in civil practice. The prevalence of coughs, colds and pulmonary diseases in France, and the susceptibility of the freshly arrived American troops to the same, made the employment of general anesthesia impossible in many cases requiring surgical measures for their relief.

For years the writer has been employing local anesthesia in the treatment of diseases of the rectum and anus, as well as in the radical treatment of hernia. On account of its many manifest advantages over general anesthesia, it had been used in suitable cases as the anesthetic of choice in civil practice. In a war hospital where expedition in the handling of surgical cases, minimized hospital confinement, and early return to duty were of prime importance, anything which would hasten the desired ends, was of distinct benefit. Added to this was the prevention of the great danger of post-anesthetic complications, involving the lungs and kidneys, as well as the fact that on account of the absence of post-operative vomiting, the patient's nutrition could be built up so much sooner. Another important advantage is the fact that the anesthetist can be dispensed with. This releases a medical officer for other more important duties. An operation under local anesthesia can be performed more rapidly than in the time allowed for the administering of a general anesthetic and of performing an operation together. This meant more surgical operations could be performed in the same length of time.

In addition to the surgical procedures mentioned above, many operations on the scalp and skull, rib resections, amputations of fingers, and secondary suture of wounds of considerable extent, excision of infected wounds, operations for phimosis, varicocele and bubo were performed readily under local anesthesia.

In the author's surgical service, the average time required for an operation for inguinal hernia was seldom over twenty-five minutes. Five or six rectal operations were performed in one hour and the average secondary suture required about the same time. Rib resections were completed in fifteen minutes and colostomies and the operation for appendicular abscess were performed in fifteen minutes.

The employment of a hypnotic before operations under local anesthesia is of prime importance. The administration of twenty grains of chloretone one hour before operating, or of a quarter or third of a grain of morphine one-half hour before operating was the author's usual practice.

The patient would come to the operating room in a quiet tranquil frame of mind. His ears were muffled with cotton and a towel placed over his eyes and all unnecessary noises and conversation eliminated. If however, a patient wished to converse with the operator, he was allowed to do so, and oftentimes the operation took on more of the character of a social visit, than that of a surgical procedure. Patients would leave the operating room smoking cigarettes and would go back to their wards cheering up the patients who were to follow.

The absence of after-pain was a very pleasant feature of the employment of local anesthesia. The solution used was one quarter of one per cent. novocain to each ounce of which was added six drops of solution of adrenalin chlorid. It is of the greatest importance to use sufficient solution to secure pressure anesthesia and important nerves such as the ilioinguinal in hernia should be well blocked by perineural infiltration.

Any of the operative measures used under general anesthesia in the treatment of hernia can be just as well employed under local. The average time required for the hospitalization of a hernia case where local anesthesia was employed in its cure was reduced one week. The value of this saving of time in military life is of great importance and in civil life, it should be equally so.

Sepsis was practically unheard of, in fact did not occur as often as in cases operated under general anesthetic, which the author believes is due to the fact that there is less handling of the tissues under local than under general anesthesia.

In rectal surgery, it is unnecessary to dilate the sphincter. The employment of local anesthesia by its relaxation of the sphincter allows a better field for operative measures than the divulsed and damaged sphincter of the old regime.

Moreover the patient in most of the cases is allowed to be up and about after the first twenty-four hours. Convalescence and an early return to military duty is hastened. Patients after most operations performed under local anesthesia, seem to vie with one another in the speed with which they could be returned to duty.

In the surgical treatment of war casualties, the removal of foreign bodies, such as machine-gun bullets and shell fragments was very easily accomplished. The most suitable cases were those in which localization by the *x*-ray demonstrated the presence of foreign bodies in the soft structures and not embedded in bone.

Suturing of lacerated wounds, particularly of the scalp, was a very favorable operation under local anesthesia. Debridement, or the excision of devitalized tissue in a wound, could be done surprisingly well, provided the wound was not too extensive or involved too much muscle. Secondary suture of superficial wounds was an ideal procedure under local anesthesia.

To recapitulate, any operative procedure which can be done just as thoroughly under local anesthesia as under general anesthesia, should be performed for the following reasons:

1. It is safer.
2. It can be performed more rapidly.
3. Shock is absent.
4. Fewer assistants are required.
5. After-pain is absent.
6. Patients can take nourishment immediately.
7. Recovery is hastened.
8. Convalescence is shortened.
9. There is no fear of anesthesia.
10. Less handling of the tissues means less danger from sepsis.
11. The mental attitude is better toward local than general anesthesia, which materially assists in his convalescence, and in a ward is reflected on his fellow patients.
12. Post anesthetic complications are absent.

1016 Kresge Building.

Book Reviews

Scopolamine-Morphine Semi-Narcosis During Labor. By Wm. Osborne Greenwood, M. D. (Leeds), B. S. (Lond). Small Octavo, pp. 120, Cloth Bound. Oxford Medical Press, Publishers, New York City, 1918.

Greenwood admits that the subject of his monograph has been violently condemned by some and just as enthusiastically eulogized by others. Unfortunately the earlier experiments with alkaloidal amnesia and semi-narcosis were admittedly haphazard and it would have been remarkable if the results had not been as various as the different methods of using the drugs. Some allowance must also be made for the impurities present in earlier preparations of scopolamine.

This permanent form of Greenwood's experiences resulted from requests from many fellow-practitioners for full details of his technic. The monograph is based on the available literature of the subject and Greenwood's extended experience with the method, and patient individual study.

After summarizing the historical evolution of semi-narcosis, Greenwood discusses the chemistry and action of the alkaloidal amnesics and the objects of this particular method of obstetrical pain-relief. His recommendations regarding the technic of administration are detailed and helpful. He considers the effects on the mother and child and evaluates the results obtained, basing his conclusions on accurately kept charts. He believes that semi-narcosis has a beneficial effect on the birth-rate.

The volume closes with an interesting note on a new amnesic combination "Scop-omnopon," and a valuable bibliography.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

AMERICAN ASSOCIATION OF ANESTHETISTS SEVENTH ANNUAL MEETING.

The American Association of Anesthetists will hold its Seventh Annual Meeting in Atlantic City at the Breakers' Hotel, June 9-10, 1919, the first two days of A. M. A. week.

Among the interesting and instructive papers to be presented may be mentioned the following:

Studies in Surgical Acidosis, Yandell Henderson, Yale University Medical School; Reactions of the Nephropathic Kidney Under Anesthesia, Wm. deB. MacNider, University of North Carolina; The Acid-Base Regulatory Mechanism during Anesthesia, S. P. Reimann, Philadelphia, Pa.; Experimental Surgical Shock, F. C. Mann, Mayo Clinic; Treatment of Traumatic Shock, Fenton B. Turck, New York City; Physiology and Physics in Relation to Anesthesia, Wm. B. Howell, Montreal, Canada; Heart Lesions in Anesthesia, F. L. Richardson, Boston, Mass.; Some Advantages of the Sitting Posture in Operations on the Nose and Throat, F. D. Sanger and Griffith Davis, Baltimore, Md.; A Simple Method of Administering Ether with Oxygen and its Advantages, Jos. E. Lumbard, New York City; Some Observations on Open Ether, Robt. H. Ferguson, East Orange, N. J.; A New Method of Etherization, A. H. Miller, Providence, R. I.; Some Observations on Intratracheal Anesthesia in Neurological Surgery, A. W. Adson, Rochester, Minn.; Experiences with Anesthesia in Thoracic Surgery in the War Zone, Howard Lilienthal, New York City and other papers on Anesthesia in War Surgery, not yet definitely scheduled on account of the uncertainties of demobilization.

The Annual Dinner will be served at The Breakers, Monday evening, June 9, at 6:30 o'clock at $3.00 a cover. The principal speaker of the occasion will be Wm. S. Bainbridge of New York City, who will talk on Some Experiences of a Naval Surgeon in the War and illustrate his remarks with slides and films.

As a large attendance is expected those who expect to be at the meeting should make their reservations in advance. The Breakers, Boardwalk and New Jersey Ave., will house all the activities of the Seventh Annual Meeting, and will provide accommodations on either the European or American plan as desired.

For further particulars address F. H. McMechan, M.D., Secretary, Avon Lake, Ohio, R. F. D.

Quarterly Index

Anesthesia, Decreased Plasma Bicarbonate During and Its Cause. Plasma Carbon Dioxid, Blood and Urine Ketone and Blood Catalase Analyses in Operative Patients. S. P. Reimann and G. H. Bloom, Philadelphia. Journal of Biological Chemistry, October, 1918.

Anesthesia for Wounds of Chest. Treatment of Infected Hemothorax. W. Hutchinson. Journal Canadian Medical Association, November, 1918.

Anesthesia, General and the Circulatory Apparatus. L. Binet. Presse Medicale, December 19, 1918, Vol. xxvi, No. 70.

Anesthetic, Recent Work in. J. Blomfield, London. The Practitioner, November, 1918.

Blood Pressure Observations, The Importance of in Surgical Prognosis. Albert H. Miller, Providence, R. I. Boston Medical & Surgical Journal, January 2, 1919.

Chloroform, Action of, on Liver and Disturbances from. D. Lobo and others. Graceta Medica de Caracas, Venezuela. August 31, 1918, Vol. 44, No. 7.

Chloroform, Effects on the Heart. E. Fernandez. Graceta Medica de Caracas, October 15, 1918, Vol. xxv, No. 19.

Chloroform, Mechanism of the Action of. V. Aloi. Riforma Medica, November 9, 1918, Vol. 34, No. 45.

Deaths—Cocain Poisoning. Report of Case with Necroscopy. E. Kellert. Journal Laboratory & Clinical Medicine, December, 1918.

Deaths—Fatal Cocain Poisoning. W. Moller. Ugerkrift for Laeger, Copenhagen, October 31, 1918, Vol. 80, No. 44.

Electrolytic Anesthesia in Medico-Odontological Practice. Theodore A. Irigoyen, San Sabastian, Spain. La Odontologia, November, 1918.

Ether Anesthesia, Influence of Hemorrhage on and of Plethora from Transfusion on Pressor Effects of Minute Quantities of Epinephrin. P. Rous and G. W. Wilson. Journal Experimental Medicine, February, 1919.

Ether Anesthesia for Face and Jaw Surgery. J. C. Clavton. Lancet, October 5, 1918.

Ether Dressings. P. Descomps and A. Richard. Paris Medical, September 21. Vol. 8, No. 38.

Ether—Oil Colonic Anesthesia. R. Monod. Presse Medicale, November 28, 1918.

Local Anesthesia, Field of, in a War Hospital. L. J. Hirschman, Detroit. Michigan State Medical Society Journal, January, 1919.

Local Anesthesia, Kidney Operations Under. R. E. Farr, Minneapolis. Urologic & Cutaneous Review, February, 1919.

Local Anesthesia, Mastoidectomies under. C. T. Porter, Camp Upton, Yaphank, L. I. Journal American Medical Association, February 22, 1919.

Local Anesthesia, Cesarian Section under. W. H. Brown. American Journal of Obstetrics, December, 1918.

Local Anesthesia and Twilight Sleep in the Surgery of Exopthalmic Goiter. S. H. Rouquette. Lancet, December 7, 1918.

Local and Regional Anesthesia. C. W. Allen, New Orleans. Dublin Medical Journal, January 1919.

Local Anesthetics, The Newer. Raphael Vega Varrera, Lugo, Spain. La Odontologia, November, 1918.

Local Anesthetics, Comparative Value of some. H. C. Hamilton. Journal Laboratory & Clinical Medicine, November, 1918.

Nitrous Oxid in Labor. L. C. Redmond, Lexington, Ky. Kentucky Medical Journal, November, 1918.

Nitrous Oxid-Oxygen in Combination with Ether or C-E Mixture for Nose and Throat Operations. H. E. G. Boyle. London. British Medical Journal, December 21, 1918.

Painless Childbirth and Safe Conduct of Labor. H. Schwarz. American Journal of Obstetrics, January, 1919.

Shock, Experimental Surgical. F. C. Mann, Rochester, Minn. American Journal of Physiology, November, 1918.

Shock, Surgical, Treatment of in War Injuries. J. B. Roberts. Pennsylvania Medical Journal, December, 1918.

Spinal Anesthesia. H. P. Achard. Progress Medical, August 31, 1918.

Spinal Anesthesia. G. Palacios. Semena Medica, Buenos Aires, September 19, 1918, Vol. xxv, No. 38.

Spinal Anesthesia, Present Status of. L. Razatti. Graceta Medica de Caracas, Venezuela, August 31, 1918, Vol. 44, No. 7.

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A DISCUSSION OF THE FACTORS TO BE CONSIDERED IN DETERMINING WHETHER TO EXTRACT OR CONSERVE DISEASED TEETH.*

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In meeting the representatives of the professions of medicine and dentistry in different parts of the United States, I have been impressed with the fact that the dental profession has not given evidence of appreciation of the magnitude of its responsibilities. The rank and file of the profession still believe their responsibilities to begin and end with the repair and conservation of the teeth themselves. May I not, therefore, bring to your attention a few striking facts which tend to place these responsibilities in a light which forces a keener appreciation of them?

It is now conceded by the pathologists of the country that heart, joint, and kidney infections are largely of mouth origin. The isolation of the streptococcus viridans from the heart's blood and from ulcerating surfaces of the hearts of individuals, who have died from endocarditis, has been conclusively proven by numerous observers. The observation of our pathologists clearly indicate that heart, joint, and kidney infections are closely related, and may be regarded as one disease. This being the case, figures available from the bureau of vital statistics of the United States government tend to place in its proper relation, our responsibility as a profession. Certainly, the heart disease of the nation is largely traceable to mouth infection, and I here wish to submit figures from the Bureau of Vital Statistics for the years 1915 and 1916 on the relative importance of heart disease as compared to tuberculosis.

In the year 1915, the Bureau of Vital Statistics collected evidence to show that 105,202 people died of heart disease, while only 98,000 and some odd hundreds died of tuberculosis in all its forms. These deaths occurred among seventy per cent. of our population, because thirty per cent. of our population failed to keep statistics of sufficient value to warrant their tabulation. In the year 1916, the contrast between heart disease and tuberculosis is even more marked, for in that year, the deaths from heart disease in the registration area numbered 114,171 or 159.4 persons per 100,000 of the population. The death rate from this cause shows a marked increase as compared with 1900 when it was only 123.1 per 100,000. The total number of deaths from heart disease in the whole country, estimating our population at 115,000,000, would be 182,850. Tuberculosis, in its various forms for the year 1916, destroyed 101,396 lives in the registration area. Because of the progress in the prevention and treatment of tuberculosis, the decline in our tuberculosis death rate has been quite pronounced, having fallen from 200.7 per 100,000 in 1907 to 141.6 in 1916—a decrease of almost thirty per cent. However, tuberculosis causes more deaths than any other malady, except heart disease, and thirty-seven per cent. more than all external causes, accidents, homicides, and suicides combined. Quoting again from the Bureau of Vital Statistics, the only remaining death rate higher than one hundred per 100,000 in 1916 was that of Bright's disease and acute nephritis. The total number of deaths from these maladies in 1916 was 75,316[1].

It will be seen, therefore, that heart disease is a greater menace than tuberculosis and it is equally true that heart disease, to a very large extent, is preventable by proper mouth sanitation. The principal source of infection is the enormous growth of streptococcus viridans in the oral cavity and on tooth surfaces, whence it enters the circulation through pyorrhea pockets, chronic dental abscesses, and tonsil crypts. These vital statistics just quoted take no account of the individuals whose lives are ruined by arthritis, nephritis of streptococcal origin, neuritis, gastric ulcer, chorea, septic purpura, iritis, and several less common forms of streptococcicosus, which term has been recently advocated by Ulrich of Minneapolis to cover the various forms of inflammatory and pathologic lesions resulting from the invasion of the tissues by the streptococcus.

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* Read before The Mid-Winter Clinic of Atlanta Society of Dental Surgeons. March 14, 1918, at Atlanta, Georgia.

[1] Census Bureau's Summary of Mortality Statistics for 1915-16.

I desire to cite a case here of heart disease due to mouth infection. The above heart is that of Doctor X, who, when first seen, was suffering from a gastric ulcer. He was sound in every other particular, as far as our chief of the school of medicine, University of Minnesota, could determine, save for the presence of eight abscessed teeth. He was advised to have his abscessed teeth removed, and was sent to his home. Doctor X returned home, but did not have his abscessed teeth removed. In less than one month, he returned for further examination, at which time he was found to be running a temperature and exhibiting heart weakness, having developed a loud murmur heard at the apex and transmitted to the axilla.

The patient was sent to bed in the hospital, December eighteenth, and an ice pack was immediately placed over the heart. The routine treatment for endocarditis was given and the extraction of his abscessed teeth was advised. The first abscessed tooth removed was done with every precaution to prevent contamination of the abscess. The tissues around the area were bathed in iodine, the tooth root surface was scrubbed with alcohol and iodine. Saliva was excluded with a generous pack of sterile gauze. The tissues at the tooth neck were cauterized and the root was then extracted. The abscess sack was split and cultured from, and grew streptococcus viridans in numbers. This technic was repeated on two abscessed teeth with the same result. Then, two more abscessed teeth were removed but the patient was absolutely unbenefited by these extractions. Therefore, we ceased removing teeth. This patient ran a course in the hospital of some eighty-two days, developing a purpura of the skin of the arms and legs; also, a progressive involvement of the joints, and in the end dying from complete exhaustion. Post-mortem revealed a large ulcer in the ventricle, most of the walls of which are cut away to better photograph the ulcer. The ulcer is almost an inch in diameter, and one-eighth of an inch high. It has the appearance of a spoonful of strawberry jam flattened out on the auricular wall. The valves immediately below the ulcer have sloughed off, leaving nothing but stumps of scar tissue upon which have developed large vegetations. The pillars of the columna carneae of the heart have also ulcerated. Culture from the ulcer at the time of post-mortem developed prolific colonies of streptococcus viridans on blood agar. A root tip amputation undertaken on the post-mortem table under the strictest aseptic precautions also produced on culture, streptococcus viridans. The post-mortem further revealed small ulcers in the œsophagus and also revealed a healed gastric ulcer.

Now in regard to the kidney, it must be remembered in thinking of Bright's disease that the medical profession does not always clearly differentiate kidney disease, and not infrequently, people die of acute kidney infection called Bright's disease. The term, Bright's disease, should only be applied to general glomerulo nephritis, which affects the glomeruli of the whole kidney. This brings me to the point I want to make, that streptococcal infection, whether the mild streptococcus viridans or haemolytic streptococcus presents a complex of symptoms in many cases, which has clearly indicated to medicine that heart, joint, and kidney disease is in a great proportion of cases so closely associated that many physicians think of them as one. Whether this be a just conclusion or not, it tends to increase, our responsibility in dealing with streptococcal infections of the mouth. I here submit a table from the Minnesota Division of the Mouth Infection Research Corps of the National Dental Association for the year ending July 1, 1916.[2] In this table, Hartzell and Henrici compare the destructive character of the haemolytic and non-hemolytic streptococci and show conclusively that the non-hemolytic streptococcus of the mouth can and does invade the tissues of these animals in about the same proportions, as does the hemolytic streptococcus. One should remember in studying this table that the non-hemolytic streptococcus makes it appearance about the sixth hour after life and is always present after such time, while the hemolytic streptococcus is an occasional visitor. Therefore, the importance of the non-hemolytic streptococcus to the life of a nation is infinitely greater from the standpoint of its destructive power than the hemolytic streptococcus. This tends to place our responsibility as dentists in a clearer light.

The dental profession in years gone by has been chiefly engaged in conserving teeth without reference to or knowledge of the fact that in practicing this intensive conservation, they are oftentimes doing a serious damage to the patient, illustrated by the old aphorism, "Saving at the Spigot, but losing at the Bung." Medicine, on the other hand, has been quick to grasp every new thought or theory for controlling disease. This was clearly evidenced when the profession accepted the erroneous statements made by Bass and Johns and Barrett and Smith that amoeba was the true cause of pyorrheal infection and that emetine was a sure cure for pyorrhea. It is not surprising, therefore, that there has sprung into being a great group of medical men and a few dentists, who, to control the death rate from mouth infection, vigorously assail the conservationist and ruthlessly sacrifice many valuable teeth.

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[2] Report of the Mouth-Infection Research Corps of the National Dental Association, for the year ending July 1, 1916. Reprinted from the Journal of the National Dental Association. Vol. 111, No. 4, November 1916, pp. 333-362.

In view of the fact that the writer has contributed a large amount of the evidence upon which these destructive mouth infections have been brought to the attention of the medical and dental world, it would seem no more than fair that he should also strive to place before the medical and dental profession a true perspective from which to observe the problem which necessarily confronts every man, practicing medicine and dentistry, as to what to do with diseased teeth and under what conditions we are justified in removing necessary dental masticating organs in order to prevent greater ills than those which arise from the lack of properly masticating our food. Therefore, let us consider for a moment the pathogenic flora of the mouth.

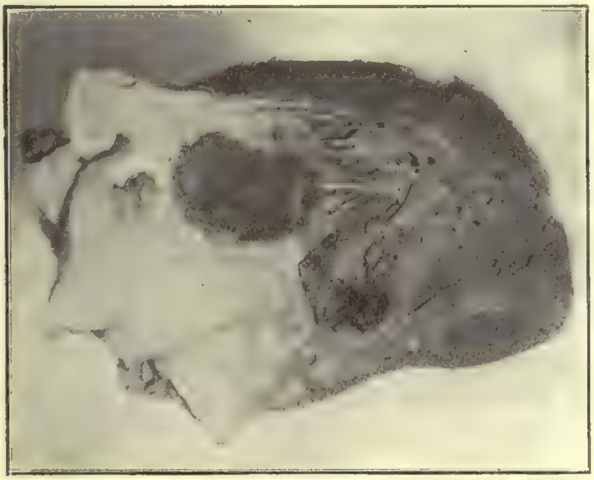

Fig. 1

A close study of the mouth flora shows conclusively that while there are a great many bacteria found in the mouth at different times, there are really only four very important mouth organisms, and these I will mention in the order of their importance.

There is first the streptococcus salivarius, otherwise known as the streptococcus viridans. Second, there is the pneumococcus. Third, the various members of the staphylococcal group—albus, aureus, and citreus. Fourth, is the fusiform bacillus. These organisms named are practically always to be found in the mouth. Of the group of four mentioned, we have found by actual investigation, by collecting the bacteria of the mouth in great quantities and administering these mixed masses of bacteria to animals, that the streptococcus is the only one which is regularly re-obtained in the lesions thus created. This same streptococcus, which bacteriologists formerly thought to be non-pathogenic, when transplanted into animals, is the germ which produces many varied forms of lesion, and according to our own observations and those of Gies and Kligler, composes approximately one-half the bulk of mouth growth.

The staphylococcus, roughly speaking, produces a little less than one-fifth of the mouth growth. The remaining twenty to thirty per cent. of mouth growth is yeasts, thread forms, spirochaete, and accidental visitants; also, the fusiform bacilli, and pneumococci.

In 1915, Madame Brailovsky-Lounkevitch, of the Pasteur Institute, published an exhaustive article recounting her experience in the examination of mouth flora from birth until adult life.[3] In this paper, she maintained and proved that the first organism to make its appearance in the mouth of a babe is the streptococcus salivarius, which occurs about the sixth hour, and from that time on until the eruption of teeth, is practically the only organism of the mouth except occasional transient accidental visitants.

We have found upon examination and study of the flora of the mouths of individuals, that from the period of eruption of teeth until adult life, this same streptococcus makes practically fifty per cent. of the mouth growth. We now know that the presence of the streptococcus is almost universal. It occurs in houses, in dust, on the skin, in milk, and in many foods. There have been at least three streptococcal epidemics produced through the medium of milk, which have been reported in the medical journals. Probably, the most striking one was that in Boston, which was described by Theobald and Smith in the Journal of Medical Research,[4] and has been alluded to by many other writers.

The individuals who advocate complete destruction of dental organs in order to rid the body of streptococcal growth, therefore evidence profound ignorance. Wholesale extraction of teeth will not rid the body of streptococcal growth. One might as well advise removal of the transverse colon to rid the body of the colon bacillus. A much more sane method of cutting down the inroads of mouth infection is that of vigorous systematic mouth sanitation together with the adoption of a diet planned to prevent intestinal putrefaction. This is just as capable of reducing the enormous mouth growth to a safe minimum as are the present methods for controlling bacterial growth in milk, now demanded by our cities. The difference by weight and count in the number of bacteria per milligramme of tooth scrapings in dirty mouths to that of reasonably clean mouths has been shown by Kligler and Gies[5] to range from eight hundred million in the dirty mouth to five to eight million in the clean mouth. Translated into terms of oral prophylaxis, we may find that ten minutes a day spent in proper mouth sanitation will produce this safe minimum. The writer's first thought then in regard to the extraction question is that correct mouth sanitation and proper diet will make ruthless extraction of teeth unnecessary. A proper education of the dental profession in a broad way will soon enable them to place in a true perspective the factors which actually justify conservation, or, on the other hand, extraction.

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[3] Contribution a l'etude d la Flore Microbienne Habituelle de la Couche Normale (Annales de l'Institut Pasteur, August, 1915, xxix. p. 379.)

[4] Medical Research, 1915, Vol. 31, page 455.

Please recall that the mouth streptococcus makes its appearance at birth, and that it forms (roughly speaking) half the mouth growth; also, that our bodies are of greater or less degree, sensitized to its presence and that its most destructive attribute is the production of secondary anaemia. Its toxins lessen vitality and lay a foundation of physical weakness in an individual for its ravages in the tissues when it becomes too numerous for the leucocytes in the blood stream to destroy the individual members of the family, which gain access to the stream. Therefore, the first broad view that should come into the mind of an individual as to the conservation or destruction of infected teeth should rest on the wealth or poverty of the blood stream. To illustrate, an individual with a full complement of red cells, five million to the cubic centimeter of blood with a haemoglobin of not less than eighty-five, and a leucocyte count of seven to eight thousand to the cubic centimeter together with a normal digestion, a normal urine, and a reasonable amount of energy, is safe in conserving any of his dental organs which might present for treatment. This conservation should be first, the reduction of mouth growth by prophylactic means to as nearly as possible the minimum, and, where teeth must be devitalized, such devitalization should be done under exactly the same kind of surgical asepsis, as is demanded of surgery of the brain or abdominal cavity.

Now, as to the other side of this question, as to when we are justified in breaking down dental mechanisms by extraction. This must rest again upon an examination of the patient's vital resistance, expressed by the blood stream, together with any evidence which tends to prove that the individual has been oversensitized or brought into a condition of anyphylaxis to streptococcal infection by a long exposure to such infection. A clinical picture, which would demand extraction, might be as follows: Early history of tooth and tonsil infection, swollen glands, draining the mouth and throat area, poverty of red cells, reduced haemoglobin, and a markedly increased or decreased leucocyte count. It is a well recognized fact that a leucocyte count above ten thousand is strongly indicative of deep seated infection, while a low leucocyte count, say five thousand or less, points to the fact that the leucocytes are waging a losing battle, particularly if such reduction in number is accompanied by reduced haemoglobin. If a clinical picture presents with the evidence of secondary infection, myocarditis, endocarditis, or nephritis accompanied by joint or kidney disease (evidenced by casts, albumen, or sugar) extraction is justifiable. Any of the factors above recited, accompanied by the poverty of red cells and poverty of haemoglobin, even if the leucocyte count be normal, fully justify the extraction of diseased teeth. One might go on and enumerate combinations of clinical pictures which would bring in many other physical conditions dependent upon streptococciosis. For instance, in chronic streptococcal infection, one infrequently finds cholecystitis, and on palpation, an enlarged spleen. While the dentist, who has not had the advantage of a medical training, may not be capable of gathering all the evidence tending to establish a condition demanding the positive eradication of all primary sources of infection which can be reached, he can always or almost always bring into his counsel, an internist or the family physician to aid him in gathering the necessary data on which to base a sane conclusion. The time is fast approaching, if not already here, when the men in the practice of medicine and dentistry are willing to listen to the arguments, pro and con, which should determine a wise course of treatment. Individuals, who present a clinical picture which tends to establish the fact that the body has waged an unsuccessful war against streptococcal infection for a series of years, perhaps from youth up, and who are now suffering from any one of the evident phases of streptococcal infection, had better exist without teeth than go on with a primary intake from even one abscessed tooth. It is my observation that many times a sensitization of years standing with a single, small continuous source of infection is sufficient to maintain such a marked secondary condition as to utterly unfit the individual for the duties of life. Let me mention a case illustrating this point.

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[5] Journal of Allied Societies, September, 1915, Volume 10, number three, pages 282-331.

A man forty-eight years of age, six feet, one inch tall, weight two hundred pounds, with a normal blood and urine, having led a very active and vigorous life and possessing a very strong denture, was, during the latter part of 1916, stricken with septic purpura of the upper and lower extremities. This purpura came on following any muscular effort and was exaggerated by walking or carrying even the moderate weight of a light traveling bag. The hemorrhages would disappear on rest in bed, only to re-appear when muscular effort was indulged in. The patient sought relief in different parts of the country and was advised that his tonsils were possibly the source of his infection. Consequently, his tonsils were removed in 1916 with some temporary benefit resulting thereafter, but after a period of rest, and the patient later again attempting to work, the hemorrhages recurred in greater numbers. When this man was first seen by the writer, there had recently occurred a large crop of new hemorrhages on his arms and legs. Patient was advised to go to bed and rest for a few days. Accompanying the purpura, was a broken compensation, which heart lesion doubtless originated from the same source of infection which caused the hemorrhages under the skin. The patient was subjected to a very searching physical examination by the chief of medicine, University of Minnesota. No source of infection could be demonstrated. Finally, this patient was referred to the writer for an examination of his mouth, and it was found that the individual had two devitalized teeth with very slight granulomatae about their root ends. The gums adjoining the teeth were rather a purple or lavender color and very much thickened. No pus could be squeezed from the gums, although an instrument could be thrust into the gum crevice of the molar region both above and below from one-eighth to one-fourth of an inch. There were exhibited a few deposits on these roots. The removal of the deposits caused profuse hemorrhages from the gum, but no pus was seen to issue from these gums at any time. Slow treatment of the teeth was practiced, operating upon one tooth at a time and allowing a period of three to five days to elapse before another was touched. Upon complete cleansing of all the root surfaces, the hemorrhages had quite disappeared and have never recurred in any great amount since. The patient occasionally, under heavy stress, will have a very few small punctate hemorrhages on the lower extremities above the ankles. Since the mouth treatment was given him, patient has been engaged in his usual vocation for the past four months, although he has been incapacitated for the previous two years. The follow-up treatment in this case has been vigorous massage, which emptied the congested and infected blood from the tissues adjacent to the teeth into the general blood stream, so that the bacteria hitherto lodged in these tissues were readily phagocyted. This after treatment was most important. The patient has also practiced intensive mouth and tooth sanitation, rubbing the teeth until they shine and removing from them most of the daily growth of bacteria. In this connection, it must be remembered that the streptococcal growth, when absolutely unrestrained by physical conditions, doubles every thirty minutes. Therefore, the great importance of vigorous scrubbing of mouth and tooth surfaces with the plentiful use of water to flush out the organisms, and the use of disclosing stain to guide the patient in his effort to get his teeth clean, and to restrain the growth and lessen the number of bacteria from day to day, is here emphasized.

I have mentioned this particular case, because septic purpura is comparatively rare and had it not been for the method adopted in eradicating this infection, the patient would never have completely recovered, as with a broken compensation dependent on myocarditis and a previous old endocarditis, had complete extraction been performed at one sitting, the result might have been the wrecking of the patient's whole chance of life. A normal blood and urine justified conservation.

Let me relate another case history, in which extraction was wrongly advised—that of a young woman thirty-two years old with an arthritis of the ankles and insteps of sufficient severity to make walking extremely painful, with absolutely no source of infection hitherto discovered to explain the arthritis. Examination of the mouth showed that every tooth in the upper and lower arch was vital. No large cavities existed and no lesion of the mouth, save a very vigorous gingivitis, involving less than one-eighth of an inch of the gum margin. Upon the application of disclosing stain, masses of bacterial placques were revealed, covering all save the grinding surfaces of the teeth. This patient was so extremely sensitive that even in doing an ordinary prophylaxis, it was necessary to administer an anaesthetic. Five different treatments, five days apart, using fine stones to grind out the pits dissolved into the enamel surface by the heavy masses of acid-forming cocci, and the reduction of mouth growth resulted in complete reduction of the swelling of the ankle and instep, and the continued practice of mouth prophylaxis of fifteen minutes a day, massaging the gums with the ends of half inch cotton rolls and scrubbing the teeth with brush and paste, applying disclosing stain twice a week, resulted in a complete cure of the gingivitis and the arthritis of the feet, which cure is still perfect. It must be remembered that no dead pulps existed and no teeth were extracted and the blood picture was good.

Take a third case, a young woman thirty-five years of age; two children, one eight years old, and the second child lost from purpural uraemia, accompanied with a blood pressure of 250. No cause known for the uraemia. Patient was advised that the condition arose as a result of mouth infection and was referred to the writer for the complete removal of all her teeth. A careful examination of the teeth in the arches showed pyorrhea pockets around the molars, none of which were more than one-eighth of an inch in depth, and two pulpless teeth, left and right laterals in the upper arch. The roots of these teeth were rather imperfectly filled and presented small granulomatae. The treatment given this patient was slow inoculation by pyorrhea treatment given seven or eight days apart, and was completed by the amputation of the two diseased root tips in question. The patient at the beginning of treatment presented casts and albumen in her urine, and possessed a blood pressure of 250. At the close of her mouth treatment, the blood pressure had dropped to 190 and only an occasional trace of albumen can now be found in her urine.

These three cases serve to illustrate what may be done by intelligent conservation accompanied by proper daily mouth sanitation. In these three cases, the haemoglobin and red cell count were practically normal, and the leucocyte count showed a rise of two to three thousand. Had these cases presented very marked anaemias or past histories of long drawn out chronic infections it probably would have been impossible to have benefited them, but the leucocyte count and the haemoglobin indicated to the writer a strong possibility for cure. Though in two instances, complete removal of the teeth was advocated, no teeth were removed, while in the case of septic purpura, the third molars were removed because the pockets around the third molars were more than one-fourth of an inch in depth, and the balance of the denture was in such perfect condition that the patient could well afford the loss of his third molars.

Allow me to present a case illustrating the line to be followed where secondary anaemia has existed for some time.

Mrs. D., seventy years of age, presented a set of sound teeth, which formerly had been affected with pyorrhea. Pockets around teeth but not discharging pus. When she first appeared April 17, her red cell count was 3,000,000 and her haemoglobin was 70. Patient desired the removal of all her teeth as she had spent the winter in the South and lived under the most encouraging conditions to improve her health and increase the haemoglobin and red cell count. No improvement of anaemia occurred. Slow extraction of her devitalized teeth was undertaken, as well as those affected with pyorrhea—one tooth every week or ten days. Since this has been accomplished, her red cell count has increased to 4,100,000. In this case, pyorrhea treatment had been administered three years before, and as far as the mouth tissues were concerned, the treatment was apparently successful. Nevertheless, there must have been a sufficient amount of growth around the dead teeth and in the seemingly healed pyorrhea pockets to reduce the patient's haemoglobin and blood count. Though no masticating surfaces have been placed in this mouth following the extractions, the patient being limited to the incisors and cuspids above and below, the red cell count has increased.

In this case without a blood picture, conservation would surely have demanded retention of the teeth. The blood picture, however, fully justified extraction, and though it was necessary to break down a good masticating mechanism, the patient was greatly benefited as far as her general health was concerned. In this connection, too much stress can not be put upon the pioneer work done on the subject of haemanalysis and urinalysis by Colonel Wm. H. G. Logan. The result of his experimental work is recorded in the Dental Review, September, 1916.

Another case, a man about sixty years of age presented teeth which were apparently solid in his arches, but with a series of pyorrhea pockets involving most of the teeth. This case seemed to be clearly within the scope of successful treatment. Therefore, one pyorrhea treatment was given, which markedly reduced the energy of the patient. The patient returned in one week for an additional pyorrhea treatment. Immediate examination of the urine was suggested. The urine was carefully examined. The specific gravity was high and it contained between four and five per cent. of sugar. Conservative treatment of these teeth was immediately discontinued, and extractions were undertaken at intervals of seven or eight days apart. In this instance, the patient was saved the burden of pyorrhea treatment. Under ordinary conditions with a healthy kidney and normal blood picture, these teeth would have been treated.

Therefore, we need to emphasize the fact that modern means of laboratory diagnosis and the taking of careful case histories with the modern X-ray pictures, should be the foundation stones upon which conservative or destructive dentistry should be determined.

If the dental and medical professions will get together on all cases in which extraction is advocated, and will gather and weigh the evidence each case presents, it seems altogether likely to me that we can arrive at such a sane and reasonable judgment of the conditions that justice will be done to all.

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Medical Leaders.

Physicians frequently express themselves as resentful of the lack of consideration they receive at the hands of those endeavoring to secure hygienic reforms. If the medical profession, through its organizations, were in the forefront of health movements and were less reticent in expressing their views and convictions, it would not be necessary for them to be consulted, but on the contrary they would be in the position of inviting the cooperation of those who, under present conditions, are accustomed to going ahead without consideration of the possible support to be secured from medical societies. As long as this latter state of affairs continues medical men cannot hope to win and hold the place in their respective communities to which their knowledge and training give them a right to aspire.—*American Medicine.*

CERVICAL SYMPATHECTOMY AS A MEANS OF A PERMANENT CURE OF FACIAL (TRIGEMINAL) NEURALGIA.

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Whatever may be the cause of facial (trigeminal) neuralgia, its cure remains an uncertainty as medical treatment fails in almost every instance; few methods if any, proving absolutely sure.

The radical operation for the removal of the gasserian ganglion is too difficult of execution for the average surgeon, and not a few cases are on record where the pain persisted in spite of its complete removal. (J. B. Murphy, Doyen, Krause and others).

The same criterion may be applied to the method advocated by Frazier of the intracranial severing of the sensory root.

The author practiced in Mexico for a number of years, in which country, trigeminal neuralgia is common. The various peripheral surgical methods were tried, including those of Tansini and Laplace, with varying results; in most instances the pain returned after short, or sometimes longer, intervals of ease. Deep injections of alcohol gave, perhaps, the best results of all, though unfortunately the pain returned in from nine to twelve months, when the injection had to be repeated. In a few cases a keratitis was observed, and even actual loss of an eye.

As accident would have it, we had a patient suffering from glaucoma (left eye) and left-sided trigeminal neuralgia (mostly of the first division). We resorted to cervical sympathectomy and in less than three months, the severe neuralgia had disappeared and did not return in the five years or more, the patient being under observation.

It has been my habit when performing this operation for neuralgia, to inject alcohol at all points of exit of the trigeminal nerve from the skull, avoiding injecting it inside the foramen ovale; in this manner there is a decided immediate relief from pain, which is not the rule when performing sympathectomy alone.

It takes unusually weeks, (three months or more), before a definite relief is noticeable, when simply removing the cervical ganglion and branches given off from it.

A most interesting case is that of a Mexican peon who suffered from tic-douloreux of the left hand, following a crushing injury to it some months previous. He attempted to relieve the pain by plunging the hand into boiling hot oil which promptly produced a claw-hand, but did not relieve the pain. Later on he went to Mexico City and was operated on; linear scars demonstrating that operations had been performed on the median and ulnar nerves. This did not relieve the pain either. Later, an operaton was performed by a Mexican surgeon, which consisted of the exposure and injection with osmic acid of the individual branches of the axillary plexus. This also, produced no relief. At this time he began to suffer from trifacial neuralgia, which, in a short time could be classified as a genuine Neuralgia Quinti Major.

A cervical sympathectomy was now performed with the view of relieving the facial neuralgia, in which we succeeded in the space of between two and three months. In this case, superficial and deep injections of alcohol were made at the various trigeminal foramina. Jointly with the facial neuralgia, the pain in the hand disappeared.

Patient, a banker, 60 years old, had facial neuralgia for several years, developing into a true Neuralgia Quinti Major (dextr.). He was unable to swallow cold water or brush his teeth; most of his teeth had been extracted with a view of relieving the neuralgia and several operations (peripheral) had been performed, but in vain: Osmic acid had been injected without result, besides causing a severe slough at points of injecting it. Under twilight sleep and local anesthesia, cervical sympathectomy and superficial injections of alcohol were performed. Inside three months the patient could swallow cold water and brush his teeth.

Leriche (in Archiv. de Mal. de Coeur, Paris, Feb., 1907. X #2) writes of peripheral and periarterial sympathectomy, for the cure of certain neuralgia of the viscera (denudation of coeliac artery.) Some authors mention a case of causalgia of the median nerve by resecting a portion of the sheath of the brachial artery.

Several cases of permanent cure of sciatica have been reported by Jacobsen of Copenhagen, by resection of a portion of the sheath of the femoral artery.

Veyrassat in (Rev. Med. da la Suisse Romande Geneve. Jan. and Feb., XXXVII) mentions a case of malperforans, cured by resection of the sheath of the femoral artery, a similar operation also done for Raynauds disease. The author calls his method peri-arterial sympathectomy.

The uniformly good results we have obtained in a series of more than fifty cervical sympathectomies, with or without the deep and superficial injections of alcohol, without a single mortality, leads me to publish this article to urge the method as one worthy of a trial.

The method followed is that which is described in most text books of surgery.

A very good illustration showing the incision into the carotid sheath and exposure of sympathetic ganglion, can be seen in *Collected Papers of the Mayo Clinic* of 1915, pages 338-339.

It is possible that the remarkable relief that invariably (though at times tardily) follows cervical sympathectomy is due to the fact that the parts where the pain is located, are suffering from anemia, and the cutting of the sympathetic produces a vasoparalysis with subsequent vaso-dilatation so that the anemic parts become permanently flooded with blood.

On many occasions we have performed cervical sympathectomy under the combined action of local anesthesia of novocaine- quinine- potassium sulphate- adrenalin, in physiological salt solution, and a hypodermatic injection of morphine-scopolamine-atropine.

A factor of value in the speedy performance of this operation is the placing of Crile's screw-clamp on the external or common carotid artery. A bloodless field is thus at once secured.

Anyone who has treated patients suffering from neuralgia of the first division of the trigeminal nerve, knows how difficult of treatment such cases are. These cases cannot be reached by the deep injection of alcohol. Resection of the supraorbital and trochlear nerves always result in return of pain, and avulsion of the gasserian ganglion is rather too serious an operation to resort to. It is exactly in such cases that cervical sympathectomy shows its great value, though as has already been mentioned, the relief is somewhat slow in developing.

LUMBAR GANGLIONIC SENSITIVENESS

In cases in which hypersensitiveness of the left lumbar ganglion is discovered on pressure we discount the importance of the sign relating to the appendix and look for some irritative lesion in the pelvis. The pelvic sympathetics gather and transmit impulses over such a wide distribution that both sets of lumbar ganglia may become hyperalgic but when the appendix alone is involved the right lumbar ganglionic sign standing alone becomes the most important one in differential diagnosis.—R. T. Morris, in *The Medical Record*.

VERTIGO: ITS SIGNIFICANCE AND DIAGNOSIS IN RELATION TO GENERAL MEDICINE AND SURGERY.

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Fifty-eight years ago Meniere published his classical paper outlining a more or less definite group of symptoms produced by hemorrhage into the labyrinth, associated with vertigo, and followed by incurable deafness. It is unfortunate that this syndrome, with which the name of Meniere has been intimately associated, has conveyed to the general medical profession the idea of an existing ear pathology for which little can be done in a therapeutic way.

While latterly otologists have drawn a clear distinction between true Meniere's disease, of the type to which he referred in his paper, developing suddenly in individuals without previous ear trouble and Meniere's syndrome, occurring in those suffering from some affection of the middle ear, this distinction is not universally understood and appreciated by the medical profession; therefore, excepting among otologists, there is a tendency to regard any patient presenting the group of symptoms described by Meniere as having an incurable ear disease for which only palliative treatment and a hope against recurring attacks can be given.

Meniere described the case of a girl who became chilled at her menstrual period; this was followed by bilateral deafness, accompanied by severe tinnitus, vertigo and irremediable vomiting, from which she died. Necropsy revealed nothing in the brain or spinal cord to account for death; but when the temporal bones were examined the semicircular canals on each side were found filled with blood and fibrous exudate. From this and several similar cases he constructed the clinical picture of a distinct acute disease characterized by bilateral deafness, vomiting and tinnitus, which he attributed to labyrinthine hemorrhage.

Important advances have been made since the time of Meniere,—when he showed that vertigo might be associated with diseases of the internal ear. It soon became obvious that cases of Meniere's disease were not all due to hemorrhage into the labyrinth, and the term Meniere's syndome appeared more applicable. Under this heading are grouped cases characterized by attacks of vertigo associated with tinnitus and deafness; but such cases may differ widely as regards their etiology and pathology.

Much of the chaos enshrouding the subjective symptoms of vertigo has been eliminated by the investigations of Robert Barany, formerly of Vienna, but now of the University of Upsala, Sweden. For his researches on the ear he was awarded the Nobel prize in medicine in 1915. Great credit is also due Jones, Fisher, Mackenzie and Lewis—all Americans—for what they have accomplished in rendering the work of Barany more practical for every-day use.

What do we mean when we speak of vertigo? Panse in his classical work on "Schwindel or Vertigo" defines it as a delusion of our sense of position in space. Again, American ingenuity has come to our aid in suggesting a more comprehensive definition, viz., a sensation of motion which is contrary to fact. This sensation may be either positive or negative.

Everyone understands that the ear is the sense organ of hearing, but it is not so generally known that the internal ear also contains the sense of equilibrium. The recent World War has assisted in the dissemination of information concerning the latter fact, because of the imporance it has attained in the science of aviation.

Our equilibrium in space is maintained by means of (a) the eyesight, (b) the skin, muscle, joint and viscera sense, known as the kinesthetic sense, and (c) the vestibular mechanism or apparatus. Our visual and kinesthetic senses serve other functions, but the sole function of the vestibular apparatus is the maintenance of normal balance. The vestibular apparatus embraces the kinetic-static labyrinth of the internal ear, which consists respectively of the semicircular canals, the saccule, the utricle and its various connections with and throughout the central nervous system.

The normal individual knows when he is standing erect, inclined backward or forward or to either side, or whether he is lying or sitting; he is also cognizant of whether he is moving in a straight line, forward, backward, or to either side, or vertically upward or downward; he is also aware of movements in a circle in any of the three planes or the resultant of these planes. All these physical phenomena are made apparent by the kinetic-static labyrinth.

Just as normal equilibrium is maintained from three sources—ocular, kinesthetic, and vestibular—so may we have three types of vertigo. In ocular vertigo there are accompanying symptoms which direct attention to the eyes as the source of the disturbance, the vertigo disappearing when the eyes are closed. Kinesthetic vertigo is usually associated with slowly progressive disease, such as tabes, multiple sclerosis, etc., and on that account time is permitted for compensation; when present it is aggravated by closure of the eyes, which calls attention to its source in the kinesthetic apparatus. Vestibular vertigo is rotational in character and is far more unpleasant than either of the foregoing types. Hitherto this form of vertigo has been most frequently associated with diseases of various organs, and for that reason has been erroneously called "renal vertigo," "stomach vertigo," "liver vertigo," etc.

Considering the variable character of vertigo, does it not seem strange that examination of the ears can assist so materially in analysis of its manifestations and in determination of the cause? Since the vestibular apparatus controls equilibrium, vertigo appears when there is interference with perfect equilibration. It must therefore be remembered that vertigo is a clinical entity, and that it occurs only when there is disturbance of the ear and its associated intracranial pathways. In other words, vestibular vertigo can only occur when there is disturbance of the vestibular apparatus, and therefore vertigo is essentially an ear problem.

Normally both ears are constantly transmitting stimuli of equal tone to the body muscles to maintain equilibrium, and when spontaneous vertigo is experienced by the individual it means that somewhere along the paths of the vestibular apparatus something has occurred to produce inequality in the flow of tonic impulses. The significance of this lies in the fact that the intangible something may be due to slight disturbance in function or irritation evanescent in character which may leave the vestibular apparatus intact; on the other hand, however, it may be due to a lesion in the end-organ, the labyrinth itself, or the labyrinth may be intact and the lesion located somewhere along the associated intracranial pathways.

When the ears are powerfully stimulated two main reactions occur, viz., (a) nystagmus, an objective reaction, and (b) vertigo, a subjective one. The objective responses, past-pointing and falling, are resultant of the induced vertigo. These reactions and responses are primarily induced by endolymph movements within the labyrinth. To simplify the remembering of what the normal responses should be, Jones and Fisher have given four distinct laws:

(1) The eyes are drawn in the direction of the endolymph movement:

(2) Vertigo is always opposite to the endolymph movement:

(3) Falling always occurs in the direction of the endolymph movement:

(4) Past-pointing always occurs in the direction of turning.

In postulating the central course of the fibers of the vestibular portion of the eighth nerve, Jones and Fisher claim the fibres shown histologically by Cajal—which proceed from the vestibular labyrinth and enter Deiters' nucleus, thence proceeding to the cerebellum by way of the inferior peduncle—are the fibers from the horizontal canal, and that the fibers from the vertical canals shunt Deiters' nucleus, and passing to the inside, ascend into the pons. Here, in some undetermined center, they undergo branching described as a "Y," the vertigo fibers entering the cerebellum through the middle cerebellar peduncle, whereas the nystagmus fibers enter the posterior longitudinal bundle, being thence carried to the nuclei of the third and fourth cranial nerves.

Jones and Fisher also describe a "Y" in the branches of the fibers from the horizontal canal, one carrying the vertigo fibers through the inferior cerebellar peduncel to the cerebellum, and the other carrying the nystagmus fibers which enter the posterior longitudinal bundle, thence proceeding to the nuclei of the third and sixth cranial nerves.

The vertigo fibers from the vertical and horizontal canals meet in the nuclei of the cerebellum, *i. e.*, fastigii, emboliformis, and globosus, and proceed together decussating in the crura cerebri to the second temporal convolution of the opposite side, postulated by Mills as the "vertigo center."

Using the foregoing conception of the central differentiation of the fibers of the horizontal and vertical canals, the following "phenomena complexes" have been developed; and these having been noted clinically have been checked in a surprisingly accurate way with post-mortem pathological findings:

(1) If after ear stimulation no responses are obtained either from hearing or vestibular tests, we are dealing with a dead labyrinth, or eighth nerve, or both:

(2) If stimulation of the horizontal semicircular canals produces no nystagmus, but normal

vertigo and past-pointing, the lesion is located between Deiters' nucleus and the posterior longitudinal bundle:

(3) If after stimulation of the horizontal canals there occurs normal nystagmus, but no vertigo and no past-pointing, the lesion is suggested as being in the inferior cerebellar peduncle of the same side or at a point beyond in the vestibulo-cerebello-cerebral tract:

(4) If stimulation of the vertical semicircular canals produces no nystagmus, but normal vertigo, past-pointing and falling, the lesion is located in the pons between the unnamed center, where the nystagmus and vertigo fibers divide, and the posterior longitudinal bundle: Should the lesion exist further backward toward the medulla it would involve both the nystagmus and vertigo fibers of the vertical canals:

(5) If stimulation of the vertical canals produces normal nystagmus, but no vertigo, past-pointing or falling, then the lesion is suggested in the middle cerebellar peduncle or beyond at some point in the vestibulo-cerebello-cerebral tract:

(6) If stimulation of the vertical semicircular canals produces normal nystagmus, but no vertigo, past-pointing or falling, a lesion of the cerebellar nuclei of that side is indicated, or it may be in the upper portion of the pons where these fibers again come together at their decussation in the superior cerebellar peduncle. At the latter location conjugate deviation of the eyes instead of nystagmus may occur, showing involvement of the cerebro-ocular tract which transmits the stimuli for the production of the fast component of the nystagmus.

From the foregoing an idea may be obtained as to the manner in which we interpret the findings after the ears are artificially stimulated by the turning, caloric and galvanic tests. When the patient complains of spontaneous vertigo, it must first be determined whether we are dealing with an ocular, kinesthetic, or vestibular vertigo. A complete and thorough examination of the vestibular apparatus is then necessary to properly classify the case and arrive at a correct diagnosis. To save time one should obtain and accurately record all valuable data; such a record will be of aid for analysis and future reference. Jones and Fisher have given us an excellent chart which I consider one of the greatest advances in the standardization of the Barany tests.

In conducting an examination of the vestibular apparatus we first determine the condition of the cochlea, or auditory portion of the internal ear, and examine for spontaneous phenomena such as nystagmus, vertigo, past-pointing, and falling. The hearing tests are those elaborated by Dr. B. Alexander Randall, of the University of Pennsylvania, and show all the data necessary. These tests may be so quickly and accurately applied that there can be no excuse for failure to make hearing tests rountinely.

After the spontaneous phenomena (if present or absent) have been recorded; the ears are stimulated by the turning, caloric, and galvanic tests, after which the results are interpreted. When a lesion has been located in the vestibular apparatus, we must next determine if possible the etiological factor producing the vertigo. Space and time forbid entering into great detail, but generally speaking vertigo may be caused by:

(1) Involvement of the ear mechanism by a lesion in the ear or eighth nerve, such as hemorrhage, effusion, various kinds of labyrinthitis, inflammation of the middle ear producing congestion and irritation of the labyrinth, leukemic infiltration, trauma, neuritis, low-grade specific meningitis, etc.:

(2) Lesions affecting the intracranial pathways, such as hemorrhage, trauma, tumor, abscess, thrombosis, infarction, tubercle and gumma formation, multiple sclerosis, syringomyelia, meningitis of various types, polioencephalitis, etc.:

(3) Involvement of the ear mechanism by toxemias from any organ or part of the body. chemical poisoning from alcohol, lead, salicylates, quinine, etc.; infectious fevers, such as parotitis, scarlet fever, typhoid fever, nephritis, gout, lues and focal infections:

(4) Involvement of the ear mechanism by ocular disturbances.

(5) Involvement of the ear mechanism by circulatory disturbances, cardio-renal and cardio-vascular conditions.

Because of the large number and variety of etiological factors which may be thus concerned in the production of vertigo, the newer ear tests mentioned, which have been styled "Neurotology" offer much—especially to the internist, the otologist, the neurologist, the syphilographer, and the surgeon—as aids in diagnosis. There are few cases of vertigo which cannot be accurately diagnosed after a complete and thorough examination of the vestibular apparatus.

In closing I wish to impress upon you that vertigo involves essentially a study of the vestibular apparatus; and that it signifies a disturbance of that apparatus.

When you encounter a case of vertigo your first thought should be of the ear and its intracranial connections.

Viewed and studied from this standpoint the majority of cases of vertigo can be accurately diagnosed by careful application of the vestibular tests.

SOME INTERESTING CASES IN CAMP HOSPTAL, NO. 59, A. E. F.

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It is but natural that all journalistic tendencies at present, are toward the topic military. This is true whether the subjects be lay or medical, but in the case of the latter, this tendency is readily understood, and forgiven when one realizes that of every four M.D.'s in the United States, one doffed his [illegible] serge, sold his Ford and donned a blouse and [illegible] khaki, and, if he went overseas, a Sam Browne belt. And now that some of the more fortunate are returning to the land of bath where a pomme de terre is readily recognized as a potato, voices are heard throughout the land, with ever ready listeners, eager to hear those things formerly heard only by Mr. Creel. Possibly I could hold your interest were I to relate my sensations the first time I was wounded, but I have never been wounded; or how I captured my first Hun, but unfortunately, or rather fortunately for me, the Huns I saw, had been captured before I saw them. I could truthfully tell how I took and held Scabies, but a medical man's natural modesty forbids further mention of a matter so ticklish, epidermatically speaking.

So, I do not believe that I will cause any reader uneasiness, should I devote myself to a brief description of several interesting surgical cases that came under my observation at Camp Hospital No. 59, where I was the Chief of Surgical Services. Unfortunately, for those who may be scientifically interested, I have no available data, and I am relying upon my memory, but, of course data exists for all of the cases.

Camp Hospital No. 59 was a hospital of some six hundred beds and was used for the reception of wounded from evacuation and field hospitals. The brave fellows who came to us for care had been wounded from three to ten days before, at the front. Occasionally we received emergency cases from organizations nearby, an acute intestinal obstruction, perhaps, or a self inflicted gunshot wound. But, of course, the cases from the front were the most interesting and the most gratifying in results obtained, due most often, to excellent surgery in the evacuation hospitals.

I recall but one death in my service. He had a compound fracture of the femur, multiple wounds and death was due to broncho-pneumonia, following influenza. I had a number of cases that flirted with death, outrageously, but they managed to keep their names from our mortality lists, and by this time, no doubt, they are telling their awed loved ones how "rotten" was the hospital fare. But nothing was left undone by our officers, nurses and the Red Cross "workers" to render homage to those who had bled so bravely and never murmured.

There is one case that stands out most vividly. He came in with the first batch of wounded from the drive in the St. Mihiel salient. He came in on a Friday night and was "tagged" scalp wound, possible fracture of skull. I recall seeing his wound Friday night, situated on a level with, and to the left of the external occipital protuberance.

It was about two and a half inches long and had been sutured. Shrapnel was the cause. The following morning the ward surgeon requested me to see the patient as he had complained of difficulty of vision. I went to the patient's bed, where I found him in a sitting position. He had been up but had returned to bed, he said, on finding that his vision was somewhat indistinct. His answers to my questions, I noticed, were slow and deliberate and quite different, I recalled, from what they had been on the previous night. While talking to him, I noticed a twitching of the little finger of his right hand, barely perceptible at first, but convincing, when I saw a repetition of the phenomenon. I had his head bandage removed, and examined his skull most carefully and but for a slight oozing from the scalp wound, found nothing. Returning to question the patient, he said, "I—can—hardly—see—doctor," and then he suffered a slight tonic convulsion of his right arm and forearm. His left pupil was somewhat contracted, just sufficient to be noticeably smaller than the right. I ordered his head shaved, and went to the operating room to prepare instruments for trephining. Within five minutes I was again summoned to the ward and found the patient having general epileptiform convulsions necessitating the administration of chloroform. While preparations were going on for the operation, he had several of these convulsions, controlled only by chloroform, the continuous administration of which, was rendered impossible by his marked cyanosis. After bringing him to the operating room, it was the work of but a few minutes, to remove a parietal flap on the left side and to expose a dura that had lost its lustre and whose bluish, bulging appearance spelled hemorrhage, and upon opening the dura the free venous hemorrhage was, I admit, somewhat puzzling. Where did it come from? There were no clots. What brain I saw, was uninjured. Then I thought of the scalp wound. Over the dural opening I placed a piece of waxed paper, rubber tissue not being available, first having inserted a subdural drain of the same material. Covering the bone defect with the scalp flap, I opened the original scalp wound which was posterior to and below my opening in the skull. I found some clotted blood and a profuse hemorrhage at the base of the wound. There was a linear fissure in the skull and I concluded that through this fissure the blood found ingress into the cranial cavity, as the sutures made escape to the surface impossible. Of this I could not be certain and if, after my hemostasis of the scalp wound, the subdural hemorrhage still continued, I had but one alternative and that was to find and stop the bleeding sinus. I resutured the original scalp wound, having ligated the offending vessel and was pleased to see that there was a cessation of bleeding from my subdural drain. In a half hour the patient recovered consciousness, and though weak, his pulse, which had been fifty, was now ninety, and in two hours he spoke rationally and could see. He improved rapidly and in forty-eight hours I removed the sub-dural drain. In a week, both my operative wound and his original wound had healed by primary union and his only complaint was that I confined him to bed. In another week he was ready to go, minus a piece of parietal bone, 'tis true, but otherwise in perfect physical condition.

This case is rather unusual in that it is a case of sub-dural hemorrhage due to bleeding from a vessel in a scalp wound. I have never seen a similar case recorded. For rapidity of symptom development I have never seen its equal. I doubted my ability to get the patient on the operating table before he died, so rapid and severe were the symptoms. This course of symptoms was further portrayed in the operative findings, as evidenced by the lack of any clot beneath the dura. Free drainage for the blood and removal of its source, was sufficient to alleviate all symptoms and with recovery from the effects of chloroform, the patient became normal. The day following operation, the patient's pulse became normal and so remained; his temerature was always normal and his entire course until he left the hospital was absolutely uneventful. I might mention, that while on the operating table his respiratory rate was eight per minute.

Before mentioning the next case I feel impelled to comment upon the most astonishing amount of injury the human body seemed capable of suffering without fatal results. Sometimes I have been so impressed by the extensiveness of the injuries that recovery has appeared almost miraculous. I recall the famous case of the miner whose frontal lobe was penetrated by a crow-bar, entering through the superior orbital plate, I believe. This case is still famous, but no doubt its glory will be dimmed as the pages of war-surgery literature are opened.

Case II, which I desire to record, is somewhat similar in that there was brain injury, without any symptom, neurologically speaking. The patient was admitted to the hospital with a diagnosis of "compound fracture of skull, and laceration of the brain." He was an ambulatory case. About one inch to the right of the external occipital protuberance there was a pulsating mass of granulating tissue, soft and readily compressible. But the patient presented no subjective symptoms of any kind. Under a general anesthetic. I removed the granulation tissue and dissected it away from what I found and expected, 'gray matter'. This particular cerebral convolution, denuded of covering, rough and irregular, had herniated through an irregular hole in the occiput, about the size of a quarter. The edges of this defect were rough and some protruding spicules were imbedded deeply in the hernia cerebri. These were removed and the edges of the entire opening were smoothed and the brain dissected away from the adjacent flap, to which it had become adherent. This left a clean cut hole through scalp and dura through which the brain protruded. The hole in the scalp was about one-third again as large as the defect in the bone. In addition there were three linear fractures radiating from the edges of the bone defect, but no sign of depression. From an area above the wound I resected a flap of scalp and covered the brain, first covering it as I did in the previous case, with a piece of waxed paper, having my flap sufficiently extensive, so that the exposed brain was covered by the center of the flap. Two of the stitches of my flap became infected, but had no effect upon the ultimate result, which was a very effective covering over the previously exposed brain.

Now the interest in this case was not of an operative nature. A piece of shrapnel had torn away scalp, bone and undoubtedly some brain, how much I don't know. Nature immediately inaugurated healing processes with her ever-ready granulation tissue, but in her anxiety, she did not discriminate between the brain and scalp and a firm union was being developed between them. Not that it materially mattered in this case. I but mention it to better illustrate that, nowithstanding the abuses shrapnel, nature and myself, heaped upon this particular area of the occipital lobe, no untoward symptom of any kind was ever visited upon the patient. A week was the limit of his confinement to bed and in three weeks he left the hospital without sign or symptom, save a slight pulsation where had been his wound. Not so fortunate was the patient I shall mention as Case III, though were his future course followed, I am sure it would prove by far the most interesting.

This patient was admitted with diagnosis "compound fracture of skull, lacerated brain. foreign body in brain." He was an ambulatory case, a cheerful, healthy looking patient, and it was only when my questions were unanswered, that I learned that he was unable to talk. His was a true motor aphasia. An examination of his injury revealed a most interesting condition. On the left side of his head in the temporal region there was a hole not over half an inch in diameter, and as cleanly cut as though it had been made with a bone drill. Into this hole, one could see to a depth of about two inches, though I never accurately measured the depth of the wound. This hole extended directly into brain substance and throughout its extent, was of uniform diameter. At its base one could discern only brain and there was no evidence of a foreign body though his diagnosis tag so stated and no statement could be found noting its removal. Several attempts at *x*-ray proved unsatisfactory as nothing definite could be ascertained. I did not feel justified in probing for a foreign body even with Cushing's excellent soft catheter, and suction method, so I preferred evacuating the patient to some hospital where better *x*-ray apparatus and tubes were available.

The patient's condition as I remarked was most excellent save for the motor aphasia. His reflexes were perfectly normal. No other sensory or motor disturbances of any kind could be found, nor were there any evidences of disturbances of any kind in the special senses. He could hear and understand whatever was said to him; he could have been ludicrous, had they not been pathetic. He would frame his lips for a word, then make a desperate effort to formulate a sound and he read and write and his efforts to speak would would utter only grunts. After several efforts, he would smile, shrug his shoulders and shake his head in a hopeless fashion, as though saying, "No use, it can't be done." Each morning when making rounds, I spent a few minutes with him, and explained to him that he must practice trying to speak. I tried to teach him my name. At the end of a week he could say "Waw-waw," which was close enough to Wagner to make me feel that there was hope of accomplishing something eventually. Of course, cases of this type could not be retained at our hospital, as the beds were needed for the more recently wounded so this most interesting case had to go. I did not close the wound as there was a possibility of a foreign body being present, the removal of which might have been necessary. Yet I would so much have liked to know the eventual outcome. A hole in the brain large enough to admit a good-sized pen holder to a depth of two inches and only a motor aphasia as a result.

There are other cases, of more than a passing interest, which I shall mention at some future date. These three I consider of interest and regret that I have not accurate clinical data to present with them. However, though much of value is lost through this lack, I have at least mentioned the most salient points, standing out, as they do, in my mind, as cases of such unusual aspects, as not to be readily forgotten. And yet they are but a few of many thousands. And it is such cases that have taught the surgeons conservatism that is almost radical, at the same time justifying radicalism that is really conservative, as exemplified in the treatment of shattering injuries of bone and soft parts where not only has the limb been saved but a most useful limb has been added to the triumphs of surgery. And compound fractures are no longer a bugaboo, but a surgical condition that can be met as sanely as any other surgical condition. Yes, surgeons who have cared for the wounded "over there" must surely be returning to civilian practice bubbling over with a roseate optimism.

162 West 54th St.

THE EXPERIENCES OF A RHINO-LARYNGO-OTOLOGIST WITH THE AMERICAN EXPEDITIONARY FORCES.*

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(*Continued from the April Issue.*)

About the first of March of last year, I was ordered to join my old unit at Etretat, to take up my special line of work, as Cocks was going back to the States. I was sent temporarily to an English Base Hospital in Havre, in which there was a nose and throat department of five hundred beds. The nose and throat specialist (I met him later), a most capable man, was off on leave. This hospital had formerly been a beautiful yacht club, situated on the shores of the English Channel. I might have had a very interesting service if the Germans had not launched their spring drive when they did, making it necessary to take in all kinds of cases. At times we had between five and six hundred patients changing daily, who had to be cared for by four medical officers, six trained nurses and about ten voluntary aids.

However, I had a chance to do quite a little special work as ambulatory cases from other hospitals were sent here for diagnosis and treatment. I operated on a few cases of mastoiditis under very trying conditions, for there was hardly an instrument in the whole surgical kit that I had even seen before. Instead of curettes, I had to use gouges with heavy right-handed handles, none of the blades of which could ever get into an antrum. In spite of the handicaps, the cases got well—another of the marvels of war.

During my stay at Havre, I was asked to visit a nearby concentration camp at Hafleur for the purpose of reclassifying cases for the line. In all I examined nearly a thousand nose, throat and ear cases. The work had to be done in a hurry, but, nevertheless, I got a great deal of enjoyment out of it. The majority of the men suffered from delayed symptoms of gas poisoning, or said they did, and it was indeed difficult to pick out the "shrimshankers," as the English call them. There was a large number of men complaining of deafness in one or both ears. It was impossible to do justice to these men, as there were no means at hand for testing hearing accurately, nor did one have the time. The patient's facial expression, his ability to hear the spoken voice, the looks of the drum, counted for more than anything else. I always gave the patient the benefit of any doubt. Here I also saw the Austraians intimately. They measure up very well to the standards of our own men.

Again I was transferred back to the Base Hospital, and here I established a most enjoyable and instructive clinic which I would have regretted to leave, if it were not that sitting down in a closed room got on my nerves after my exciting experiences at the front.

The first thing that impressed me on my return to the Base Hospital was the large number of the personnel and nurses who were suffering from ailments of the nose, throat or ear. Etretat may be a very lovely place in summer, but at any other time of the year the wind blows through the narrow streets unmercifully, and there is almost constant rain. It was no wonder that there was infection in the air. There were a great many sinus cases, many of them acute. Fortunately, most of them were cured without operative interference. Every case was given the benefit of an *x*-ray picture, taken on a make-shift machine by Lieut. Austin Hobbs, an excellent radiographist, who unfortunately died last summer.

Besides these patients, the gas patients began to pour in. You will recall that the Germans used a large amount of gas in the spring drive, and the cases that came down to us were in a pitiable condition; for the burns were not confined to the nose and throat, but occurred on any part of the body that was exposed or particularly moist.

I determined to make a special study of the gas cases, and so made a thorough examination of the nose and throat, paying particular attention to the larynx. It will be impossible to go into details here except to say that I thought the treatment that had previously been used universally was useless—the giving of inhalations of steam after attempted neutralization of the posion. I felt that the result of the gas was a burn and that any lesions should be treated like burns elsewhere on the body. So, each day, I applied liquid albolene to the eroded parts under indirect illumination, particularly to the mucosa of the larynx. The patients were then given a bottle of albolene and a long medicine dropper, improvised after the fashion of the Yankauer dropper. They were told to use the medicine every hour or so. I also devised an inhalatorium in which the men would sit for two hours in the afternoon inhaling the moist vapor of compound tincture of benzoin. I am happy to say that this treatment met with uniformly good results. In the American Army a special service for the treatment of gas cases was created under Gen. Thayer and Col. Gilchrist, but whether any good came of it or not I do not know.

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The battle casualties were very few, other than the gas cases. One met with an interesting case now and then, such as a gunshot wound through the orbit or elsewhere. As we had no eye specialist it was necessary for me to examine the eye cases, and to use my own judgment as to whether I was capable of treating them or not. You could have judged of my feeling in the matter if you had seen the ambulance loaded with cases who had to see the eye specialist in Havre every Friday. Of course, I had to do enucleations. But that is now classified as a minor operation.

WITH THE AMERICAN ARMY,

About the middle of May I received my orders to report to the American Army. I had hoped that I would be able to go into the field again, where I felt that I belonged after the wonderful experience I had had. You can well imagine my dismay when I learned that I was to report to Base Section No. 2, the headquarters of which were in Bordeaux. Again my luck was with me, for I had to report to Col. Henry A. Shaw, whom I consider one of the most efficient officers in the Army. He is an excellent administrator and has such a charming personality that all who worked under him loved him. I was immediately placed on important work about as far removed from nose, throat and ear work as it could possibly be. In other words, I commanded hospitals, requisitioned hospitals, built hospitals, became a sanitary expert and became the head of the billetting department of the Base Surgeon's Office.

Although I did little nose, throat and ear work myself, I was able to see a great deal that was going on in the base hospitals, camp hospitals, and in the regimental infirmaries. I was amazed to find the number of men in our specialty who were doing line work. I recall very few of them by name, but I know that Lieut.-Col. Samuel J. Kopetsky was with one sanitary train and I met Lieut.-Col. Chas. J. Imperatori with another. I think it was a compliment to their adaptability and their knowledge of administration.

The placing of competent men in our line of work on administrative duties was a serious handicap to the Army in many ways I am sure. Col. McKernon was sifting the lines for competent men. The general organization he planned and the amount of work that was accomplished was not all that could be desired, and I am sure he would have felt more satisfied if he could have been able to call upon those men whose ability he knew. However, the work we were ordered to do was not without its rewards, and it will undoubtedly stand us in good stead in the future. Its chief value lay in the necessity of perfecting ourselves in diagnosis and preventive medicine. During my stay in the Army it was necessary for me to make thousands of physical examinations, both at home and abroad. It was also necessary for me to examine many kinds of wounds and to operate or assist at operations on any part of the body. Moreover, I became an expert on skin diseases, particularly when it came to scabies, impetigo and spotting pediculi. I even learned to pull teeth, and once almost became a obstetrician. In the realm of preventive medicine, I learned how to swat the fly, build latrines and grease traps, and to curb epidemics of dysentery and influenza. In fact, I learned more about medicine that I ever thought there was in medicine, and feel myself perfectly able to qualify as a general practitioner. What was of equal importance, I learned how to command men and to read men. Not for one moment do I regret having had to give up my special line of work, and I am sure other men who were placed in a like position feel the same.

I am not acquainted with the organiation of the nose, throat and ear work of the Army as a whole. I can only speak of my personal observations in the neighborhood of Bordeaux, in which territory were located some of our largest and best base hospitals. Base Hospital No. 6 (Massachusetts General Hospital) was located just outside the city. Our special work there was in the hands of Capt. Tobey, who managed it most capably. Base Hospital No. 3 (Mt. Sinai Hospital, New York) was sixty miles away, in a small village called Veauclaire, near Montpont. Here I found Major Walter M. Brickner, the editor in chief of the American Journal of Surgery, in command of the surgical work. The nose, throat and ear work was in the hands of Major Sidney Yankauer. No more need be said. Yankauer showed his usual foresight by bringing his own instruments from America. In his kit he included his instruments for laryngoscopy, for which he had a great deal of use, especially in the treatment of gas cases.* About eight miles from the city was the large hospital centre at Beau Dessert, which started in with a thousand beds, had nearly twenty thousand when I left, and would have been capable of taking care of another twenty thousand if the war had lasted until spring. Then there was the large hospital centre at Limoges, which was mainly housed in the china factories.

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*Many capable specialists were working in Base Hospitals outside our Base Sections, among them Capt. Henry H. Forbes, who informs us that most of the men had a full equipment. I can only speak of the locality in which I worked.

The nose, throat and ear work in this base section may be divided into three classes:

(1) The work in the regimental infirmaries;
(2) The work in the camp hospitals;
(3) The work in the base hospitals.

1. *The work in the regimental infirmaries.* One can well understand that at a large sick call of a morning, it is almost impossible to go into a detailed history or treatment of every case that comes along. It is marvellous that the men receive the good treatment they do, and it is a credit to the acumen of the average medical officer. For the ordinary rhinitis, pharyngitis or laryngitis only the simplest medication is used, such as a dose of salts or castor oil, swabbing the throat with silver nitrate or giving some potassium chlorate or Brown's cough mixture. It is a routine measure to examine every throat when there is a complaint of soreness, so that very few cases of acute tonsillitis go undiagnosed. These cases are at once taken into the hospital and placed on gargles and antirheumatic treatment. It is my belief that any simple condition that warrants hospital treatment receives better care in the Army than in civil life. In civil life such patients might go to a clinic and then be sent home to follow up treatment (which they seldom carry out), but they would never be taken into hospitals and made to stay there until they got well. Of course, what we call a hospital in the Army—that is a Regimental Infirmary—is far different than the hospitals we are accustomed to over here. For often a tent is used, or else one or two rooms of a dilapidated house.

I regret to say that the ear conditions seen in regimental infirmaries are not diagnosed very accurately, but that is only natural, when one considers that the average practitioner does not pretend to know much about ear conditions, and "over there" he suffered from lack of proper instruments for examinations. If the patient did not complain of much pain, a cursory examination was made. Sometimes an ear was examined for cerumen and perhaps washed out. If the patient had pain or temperature, as a rule he was transferred to a base hospital, where more careful treatment could be given him. I think that the general principle throughout the entire American Army was to always give the man the benefit of the doubt and, summing it up in general, I would state that the care was better than the men would have received in civilian life.

2. *The work in the camp hospitals.* Most of the large camps in our base section had well-organized hospitals attached to them. The number of beds to the size of the camps was not proportionate in the beginning, there being far too few beds; but it was always possible to enlarge the capacity of the hospital by erecting hospital tents. Toward the end of the summer, most of these hospitals were enlarged so that they could hold four per cent. of the total command. The greatest trouble was the impossibility of getting a suitable personnel. We were very hard up for medical officers, as few casual officers were sent over until the end of the summer, and many of those that did come to us unattached were what might be termed substandard. I mean by that, that our best men, from the medical point of view, were attached to base hospitals and the other good men were needed for administrative purposes. The result was that the Base Surgeon, Col. Henry Shaw, had to make use of unknown material and men were often sent to places where they did not fit in. Among all this crowd I seldom met a nose, throat and ear specialist, so that one can well understand that there was a great possibility that our special line of work would be neglected. In making this criticism, I want it understood that it was not always the fault of the medical officer that he was classified as substandard. It was merely that he was a square peg trying to fit into a round hole. There was one saving grace, however, and I am glad to get this opportunity to pay this compliment to the "regulars." Most of them were excellent, all-round physicians and surgeons, and thus they knew a great deal more about the nose, throat and ear than the average medical man from civil life.

In my rounds of the camp hospitals, I was often asked to look at an ear case, and in one or two instances I saw cases of acute mastoiditis which demanded immediate operation. As the camp hospitals were not at that time fitted up well enough for major operations, as a rule, these cases were transferred as soon as possible to a base hospital. But I recall one camp hospital that had an excellent operating room, a reputable ear specialist attached to it and every facility for doing major work except a suitable set of instruments. I hope I am not treading on the toes of any member of this society when I say that the "nose, throat and ear case" supplied to Army hospitals is the worst hodge-podge of instruments I have ever seen. When I looked over this set of instruments with the aural surgeon at this post, I remarked to him that I had never seen a set of instruments look so expensive and be so useless. There was hardly a single instrument for doing a mastoid operation, not a single curette that would go into an antrum and not a single rongeur. Yet there were all the instruments for doing Ballenger's radical ethmoid operation. While I was making my critical remarks, a certain Regular Army officer came in who heard part of what I was saying. He looked at me witheringly, and then informed me that he had been on a board with two or three eminent aurists who were asked to select those instruments. However, when I pointed out to him the instruments that were missing for a mastoid operation and that the patients would probably have to be transferred elsewhere to be operated upon, he agreed with me that the set was not all that it might be. I suggested to the surgeon that he send down to the base hospital for the instruments which he needed, which he did.

3. *The work in the base hospitals.* In the large base hospitals at the rear, ideal conditions for diagnosis and treatment, operative and otherwise, prevailed. Suitable treatment rooms were appointed and in almost every instance a renowned specialist was placed in charge. At Base Hospital No. 6 was Capt. Tobey and at Base Hospital No. 3 was Major Yankauer and men equally well known, but whose names I do not now recall, were at the others. Everything was done as perfectly as it would be done in our best hospitals at home. Nothing that I know of was missing, except instruments for doing specialized work, such as suspension laryngospy. As I stated before, Yankauer had brought his own instruments for this work with him, and so was able to do important work that the other men could not. All of the men in our line were very much overworked and later most of them had to take on one or two assistants.

The general run of cases were not particularly interesting and differed very little from the clinic cases we see over here. One was surprised at the number of cases of hypertrophied and diseased tonsils, which were removed when it was felt that the man's efficiency as a soldier would be increased by so doing. There were hundreds of gas cases with varying symptoms of interest to the nose and throat specialist and, any number of cases of chronic purulent otitis media, most of whom came in in the second draft. When I was an examiner for enlistment in the early days of the war, I know with what care we excluded ear cases, particularly discharging ears, and I believe the examiners for the first draft were just as particular. But, like England and France, the time came when we couldn't afford to be so particular. A bunged-up ear and a pair of steel-rimmed spectacles were not considered of sufficient importance to keep a man out of the Army. The number of cases of acute otitis media were comparatively small and naturally there were few mastoid cases. The report of the Surgeon General's Office for the year, June, 1917-1918, shows that the number of acute ear diseases in the entire Army, at home and abroad, were comparatively few. This was due in good part to the excellent general physical fitness of the men and to the usual healthfulness of an out-door life. I have never felt so positively that so many of our nose, throat and ear troubles were caused by our going from steam-heated houses and apartments out into damp, unheated air as I have since I came home from abroad. Men that live in an equable atmosphere, even though they and the air be damp all the time, are not as likely to catch infections as men who are making sudden changes from one atmosphere to another.

During my stay in Bordeaux, where I was placed in charge of the medical care of all troops in billetted areas, I had an opportunity of observing troops under real war conditions. During the summer it was easy to find accommodations for the men, as they could readily be moved out in "pup" tents if the billets were not suitable. An epidemic of fly borne diarrhea and dysentery broke out during the summer, but was soon placed under control. In the latter part of September, while I was commanding the Officers' Convalescent Hospital at Biarritz, from which I was recalled to take charge of the billetted areas again, we began to get our "flue" cases from the States, which literally poured in by thousands. I do not believe that I have ever gone through a more distressing time. Most of the sick men were new recruits and our statistics showed that a large percentage had been in service less than three months. This again proves the old army statement that men who have been recruited less than three months go through a negative phase of disease, and then will develop any known contagion, from whooping cough to meningitis. But after that time, they enter the positive phase and remain unusually healthy.

It is impossible for me to enter here into the various aspects of the epidemic and the way we were able to control it in a very short time. We had about seventy thousand cases (I do not claim this to be an accurate figure) in the force abroad, many of whom developed pneumonia, but our mortality, I believe, was not as high as in the States. All of us felt that the "flue" was not ordinary influenza, and many of us are still in doubt as to the causative agent. In some cases, positive blood cultures showed the meningococcus, type C, and cultures showed almost all the pyogenic organisms. It was readily noticeable—and I hear it was the same in this country—that the number of nose, throat and ear complications were comparatively few, and seemed to be merely incidental. This, in itself, to my mind, is an excellent argument against the disease being caused by the influenza bacillus, for all of us know how frequent are the ear complications of influenza as we usually see it.

I realize that this paper gives you no statistical data of any value. But my object in making these remarks is to let you know, in a general way, the amount and kind of nose, throat and ear work that was done abroad under handicaps which, at times, were well-nigh insurmountable. No reputable specialist at home would consider that it was possible to do the work that was done under the conditions that presented themselves. Ingenuity will always come to the fore when the necessity arises. There will be a great deal said and written about the new operative procedures in our own line and others. I refer particularly to the treatment of battle casualties, especially of suppurative wounds and the work in plastic surgery, which I regret that I had no opportunity to see. Very few of us thought of Carrel-Dakin solution and dichloramint before the war, but many of us are now trying these solutions in our work to-day. We shall no longer fear to do reconstructive surgery, and other men besides our departed friend, Dr. Roe, will do excellent work in this line. So, taking it all in all, no matter what branch of the Army the nose, throat and ear specialist went into, he was bound to come out a better and wiser man. For my own part, I consider the experience invaluable, and I am in hopes that when the Army veterans of this Society get together they will be able to present a mass of new material that will advance our knowledge considerably.

2178 Broadway.

The Scientific Habit of Mind

While the acquisition of the rudiments of medical knowledge is a part of medical education and a somewhat important part, it is nevertheless true that the sum of medical knowledge is so vast that even were it desirable to attempt to teach it, it is not possible for any single human intellect to digest and retain it. Much more important in medical education than the acquisition of mere knowledge is the development of certain specific qualities and habits of thought, the summation of which may be described as the scientific habit of mind.—George Blumer, in *The Journal of the American Medical Association.*

PROSTATECTOMY.

J. Hunter Peak, M.D.,
Louisville, Ky.

Prostatectomy signifies an operation for the removal of the prostate gland. It is indicated when the prostate becomes so enlarged from any cause as to interfere with micturition to such an extent that the health of the individual is in danger of serious impairment. Certain prostatic neoplasms may develop slowly and induce no symptoms excepting more or less dysuria for several years, then sudden urinary retention may supervene. The patient soon discovers that immediate temporary relief is afforded by catheterization, and usually thereafter becomes a catheter habituè.

The "catheter habit" may continue for months or even years, but the patient ultimately finds that further catheterization is impossible. This is oftentimes due to unequal enlargement of the three prostatic lobes and the marked urethral tortuosity thus produced. The surgeon may be called, after repeated attempts have been made to introduce a catheter, and unfortunately find that considerable trauma has been inflicted upon the urethral interior. Not infrequently it will be found that a false passage to the bladder has been thus created, which always complicates matters for both patient and surgeon because of the greater likelihood of infection. The bladder and possibly the entire urinary tract already may have become infected, in which event the false passage increases the clinical dangers and makes the prognosis more uncertain.

"Prostatism" or the "prostatic state" is usually thought of in connection with old age, but may be encountered in individuals much younger. In the aged it is usually due to benign enlargement of the gland (adenofibroma), whereas enlarged prostate in the young is nearly always due to malignancy or to acute infection. Insomuch as acute infections generally recover under adequate medical treatment, cases of that character do not come within the purview of this paper.

While it may seem suprfluous to write anything further on the subject of prostatectomy, after what has already been said by Hugh H. Young, John B. Deaver, and others, yet the operative technic has hitherto seemed so complex that some otherwise most excellent surgeons appear to have become confused and dismayed when prostatics were sent to them for operative treatment; hence, this paper is designed to briefly outline a simplified method following which no surgeon need hesitate to operate.

There are two routes of approach to the prostate, *viz*, (a) the suprapubic, and (b) the perineal. The surgeon is quite prone to follow the one most familiar to him; but the exercise of mature judgment will demonstrate the existence of many valid reasons for each method. It may be stated as a general proposition that the suprapubic route is most suitable in patients who are thin or at least not fleshy; on the other hand, it quite naturally follows that the perineal method of approach is better adapted for those who are fleshy or have thick and pendulous abdominal walls. It must be remembered, however, that where for any reason a two-stage operation is to be employed, the suprapubic route must always be selected.

The two-stage operation ordinarily should be performed only in cases where the patient has had repeated attacks of urinary retention, or when in consequence of a large amount of residual urine which has existed for a considerable period of time the bladder and the kidneys have become so badly crippled that the patient's life is endangered and where prolonged operation and protracted anesthesia made necessary by extensive manipulations would cause a high mortality Under such circumstances, *i. e.*, in the presence of crippled kidneys, vesical infection, and urethral tortuosity preventing catheterization, suprapubic cystotomy should be performed for the purpose of drainage. After restoration of normal kidney function and the vesical infection has subsided, the suprapubic wound may be enlarged and the second stage of the operation completed. With reference to use of the catheter: I believe the statement can be substantiated that where a catheter can be introduced through the urethral lumen and retained, as good or even better results may be secured by this method of procedure than by preliminary suprapubic drainage without any danger whatsoever to the patient. Therefore, it becomes obvious that any patient who can be successfully catheterized will not need the two-stage operation.

Team work has been recognized in nearly every walk of life, and people are not slow to recognize that the best results are to be obtained by the combined efforts of all working in their respective fields of endeavor; and insofar as the medical profession is concerned, team work has but one object in view, *i. e.*, the ultimate recovery and restoration to health of the sick. In the "prostatic state" the urologist conducts the urinary tests,—chemical, quantitative and eliminative,—and makes his suggestions; then under dietetic, reconstructive and eliminative measures the internist soon has the patient ready for operation; and the surgeon then finds that the most perplexing part of the work has been completed, and by ap- separated from their capsular beds and removed plying the proper operative technic the prostate is extirpated.

The suprapubic route: Equal care should be exercised in preparation of the patient for suprapubic prostatectomy as for any other abdominal section. The operative field must be shaven and thoroughly cleansed the day before, and iodine again applied at the time of operation. The gastro-enteric tract should have been kept in good condition for several days, and the rectum must be thoroughly emptied the morning of the operation. This is best accomplished by one or two low enemas of normal saline solution.

In emergency cases where the bladder is much distended from urinary retention, the viscus must be immediately opened. A median incision is made through the skin, subcuticular fat, fascia and muscles; when the space of Retzius is reached it will sometimes be found that the peritoneum "dips downward" over the anterior aspect of the bladder; this must be pushed upward out of the way to avoid opening the peritoneal cavity. The vesical wall must be incised as high as possible for two reasons: (a) when the viscus is emptied of its contents subsquent contraction will leave the opening in the most favorable plane for tubal drainage, and (b) by making a high opening the surgeon avoids the plexus of veins about the vesical neck which is a very important item in preventing hemorrhage. In cases where catheterization has been possible the bladder, which has been kept clean by irrigations for several days, is distended with normal saline solution before beginning of the operation. In emergency cases the two-stage operation may have to be performed, and this must be determined so soon as the vesical cavity is inspected and palated. However, where the general condition of the patient warrants further operative measures, and the vesical pathology is not too extensive, it is best to complete the operation immediately. After the opened viscus has been cleansed of detritus, and all bleeding points controlled either by clamping and twisting or by ligation, the surgeon then attacks the prostate.

If there exists any stricture due either to traumatism or previous Neisserian infection, it can be easily overcome by incision with the Otis urethrotome. The tortuosity of the canal from unequal enlargement of the prostatic lobes never interferes with the insertion of a steel sound, with the finger in the vesical cavity acting as a guide. It is wonderful what the steel sound accomplishes in aiding the surgeon during prostatic enucleation. By having the assistant depress the penal end of the sound between the patient's thighs, using the perineum as a fulcrum, the prostate is carried away from the rectum and brought well against the pubic arch. The sound also acts as a guide in protecting the urethra from injury and as a means of steadying the prostate during the process of enucleation; and if urethrotomy has to be practiced pressure of the sound controls urethral hemorrhage.

Enucleation of the gland is best accomplished by using long handled scissors curved on the flat. Guided by the left index finger the capsule is incised over each lateral lobe, then with the same index finger the left and then the right lobes are separated from their capsular beds and removed. The middle lobe can be easily enucleated through either of these capsular openings. Hemorrhage during this stage of the operation requires no particular attention, but must be controlled later. I have no confidence in rubber bags placed within the prostatic capsule and inflated to control the hemorrhage! it takes too long to suture the capsule, and besides it is a very difficult procedure. The quickest and best method is to insert a large Nelaton catheter, packing around it in the capsular cavity a long strip of gauze, one end of which is allowed to protrude from the suprapubic wound so it may be removed later.

The next step is closure of the vesical and abdominal walls. It is advisable to use the regular tier suture method, leaving room for the insertion of a rubber tube five-eighths of an inch in diameter perforated near the lower extremity so that drainage will continue should the end be occluded by blood clot or pressure against the vesical wall. The last suture above the tube and the only one below it should be applied as follows: Use twenty-day catgut for all sutures; let the last one above the tube and the only one below it be long enough for one end to pass through the vesical wall on the left, and the other through the right side; insert the left-to-right suture through the muscle and the right-to-left suture through the muscle, then through the fascia, fat and skin, so that when the sutures are tied on either side of the drainage tube the abdominal wall is so closed that urinary extravasation should the lumen of the tube become occluded will not enter the abdominal tissues but pass outward around the tube. The outside dressing is composed of clean gauze above and below the drainage tube held in place by adhesive plaster.

A very important part of the technic is the manner in which the suprapubic tube is held in position: Take a two inch Z. O. adhesive strip fourteen inches long and divide this in the middle one-half its length; then divide each half in the middle thus making four strips of one end. Apply this over the dressing so that the two outside strips pass beyond the tube over the dressing, and the two middle ones over the wound and around the tube, one to the left and the other to the right side. Any traction thereafter exerted on the tube does not "pull" on the patient but on the dressing. If an ordinary catheter be used, it may be fastened into the penis in the same way.

Before the patient is permitted to come from under the influence of the anesthetic, normal saline irrigation should be started to demonstrate that both the catheter and the tube are patent. The patient is then placed in bed and continuous irrigation practiced for a few hours until the water returns clear; then irrigate every three or four hours for three days when the gauze packing may be removed; then two or three times daily for the purpose of keeping the vesical cavity clean for one week; then the tubes may be removed.

The after-treatment resolves itself into simple care of the patient and watching the drainage while the tubes are allowed to remain in position; then keeping the patient as dry as possible after the tubes are removed. The suprapubic wound usually closes within ten to forty days after the drainage tubes have been discarded. The patient may be then considered well, and is able to urinate in the natural way.

The perineal route: The perineal approach to the prostate is not unlike any other perineal operation, excepting that I prefer the half-moon flap incision method. That is, begin the incision in the skin over the left ischial tuberosity, thence extending it upward in a circular course until it reaches the posterior portion of the scrotal attachment, thence downward over the ischial tuberosity on the right side. This skin flap is dissected backward nearly to the anus; a central incision is then made through the underlying tissues until the membranous urethral comes into view; this can easily be recognized by palpation over the urethral sound which has already been introduced. After the central incision has been extended through the urethral tissues, a guy suture is inserted in either side, and as the sound is withdrawn Young's retractor is introduced through the opening in the membranous urethra.

The next step is to bring the prostate into the operative field by the assistant making downward traction. The surgeon then opens the capsule on first one side and then the other, enucleating the respective lobes with the finger or blunt scissors; after the lateral lobes have been thus removed the middle lobe can be easily enucleated by pushing it into the right capsular opening with the left index finger inserted into the opening of the left capsule. Of course, the ideal operation is not to open the vesical cavity; but it is sometimes impossible to avoid this. If such an opening is made, it should be closed by immediate suture if the procedure can be executed with safety to the patient. After placing in position a catheter which is to be retained in the urethra, the capsule is packed with gauze which is allowed to protrude through a new opening made in the middle of the skin flap. The incision in the membranous urethra is closed, and the moon-shaped skin flap carefully sutured in position.

The vesical cavity is kept empty and clean by repeated irrigations with normal saline solution through the retention catheter. If the vesical wall has been so extensively damaged that it cannot be sutured, a drainage tube may be inserted and gauze packed around it sufficiently tight to control hemorrhage. If such a tube is used continuous irrigation may be practiced as in the suprapubic method. If the use of a perineal tube does not become necessary, the retention catheter is allowed to remain in situ until the perineal wound has healed. The healing process rapidly progresses after the third day when the gauze has been removed from the capsule. A urinary fistula sometimes obtains for a short time and then closes spontaneously, after which urination becomes normal.

The after-treatment is quite similar to that applicable to the suprapubic method *i. e.*, simply general care and especial attention to the comfort of the patient by keeping him as dry as possible.

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WEDGE DILATATION OF THE MALE URETHRA.

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HOBOKEN, N. J.

It was necessary to improvise an apparatus last year to replace broken Kollman dilators, which I could not get repaired at that time.

A sound 9 inches long is made by filing down a piece of steel bar 5/16 inches square, to the pattern shown. The first 2 inches is left square, for a handle. The next 2 inches is shaped into a shank, by cutting into what is to be the bottom of the sound. The first half of the shank, from the handle, is ⅛ inch thick. The remaining 5 inches is the belly, or dilating part.

The belly and shank are rounded on the bottom to a half circle in cross section. The tip of the belly is rounded on the sides and below. The sides of the shank are slightly concaved The top is left flat, except that the edges are rounded a bit to prevent cutting.

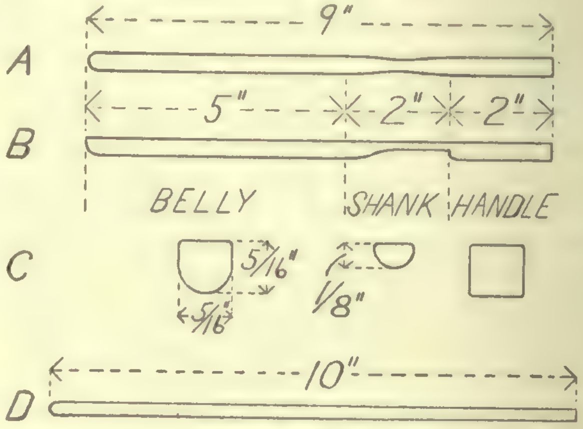

Fig. 1

A similar sound is made from ¼ inch square steel. The belly of the large sound is about 25 French; that of the small one about 20. For extensive use it is better to make each sound in three lengths; 8, 9 and 10 inches.

The rest of the apparatus consists of sixteen round rods 10 inches long and 5 to 20 inclusive in caliber. They are rounded at one end. It is cheap and convenient to make them of brass drill rods. These are calibrated in English measure, but they come in so many sizes that the numbers of the French urethral scale can be approximated nearly enough.

To dilate: Introduce a sound, keeping the top toward the dorsum of the penis, till the shank lies in the meatus. Then introduce a rod, working it along the top of the sound with a twirling motion. To increase dilatation: Withdraw the first rod and substitute a larger one. Or leave the first rod in position and work in another one beside it. I sometimes have a sound and three rods in the urethra at once.

The large sound, with a 20 rod, stretches the urethra to 35 and the meatus to 25. Thus, the range of the apparatus is restricted by the size of the meatus, but not nearly so much as that of ordinary sounds. Within these limits it does as good work as the Kollman dilator. It works as well in large caliber strictures as in chronic urethritis. In small strictures I use the rods without the sounds, singly or in bundles. They do better than ordinary sounds, because they can be twirled as they are pushed in.

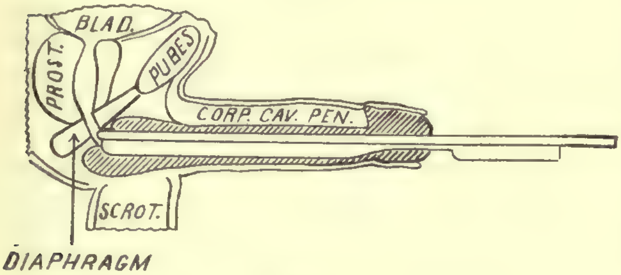

Fig. 2

It is better to dilate a stricture with two or more instruments than with one. A single instrument tends to drag a stricture back and puts a tearing strain on the normal urethra anterior to the lesion. Assume a stricture stretched by a stationary sound and a moving rod. Sound and rod bind on the stricture and on each other. But the sounds holds the stricture, against the tendency of the rod to drag it. Besides, the friction of the rod is largely used up on the sound. Thus, wedge dilatation of strictures lessens trauma. Of course, the same applies to rods used without sounds.

I do not know of any apparatus like this. But the principle is so simple that it has, quite likely, been used before. I report it, without interest in priority of invention, as a cheap, unbreakable contrivance, based on correct mechanics and not generally known.

Death and Fatigue

Death, viewed microscopically or in gross, is a phenomenon very closely related to fatigue. Certainly, fatigue is an important and necessary stage in the progress of a cell toward death. Conversely, to assure the recovery of our patient, if we can avoid cellular fatigue we will evade death.—C. M. Ramage, in *The West Virginia Medical Journal.*

A CASE OF IRITIS DUE TO 3RD MOLAR IMPACTION.

T. I. Leiche, D.D.S.
Chicago, Ill.

The Case history of Mr. C. P., Age. 42. In Aug., 1917, the patient had a severe attack of iritis and neuralgia of the left side of the face, head, neck and shoulder.

Oculist's treatment: Sodium salicylate, atropine in eye—2 injections of strepto-staphlococcus vaccine. The attack lasted three weeks. He then suffered a nervous breakdown, and was sent to the country for two months to recuperate. He recovered slowly.

In Feb., 1918, a second attack occurred, which commenced after he had been exposed to cold. The attack lasted a week. Treatment as in first attack, but instead of vaccine he was given intra-venous injection of some other remedy.

He had no history of lues. Two Wasserman tests were made, both negative.

At this time he was referred to the writer. Skiagrams were taken of both dental arches. This revealed an impacted third molar in the upper left arch.

He was advised to have it removed, but refused such treatment. In Sept., 1918, he again suffered an attack. After having been in bed about a week he presented himself to have the impacted tooth removed.

It was decided to remove both the second and third molars under infiltration anesthesia.

Within 12 hours afterwards the iritis subsided and in a week the neuralgia had disappeared.

To date there has been no recurrence of the disorder.

Golden Jubilee and Victory Meeting of the American Medical Editors Association

At its meeting on June 9th and 10th, the members of the American Medical Editors Association will celebrate the Fiftieth Anniversary of its existence and the Victory in the World War. The activities of the association during the Liberty Loan campaigns, and in the enlistment of the Medical men in the service, leave no room for doubt as to its value to the country in time of war. Its service to the profession in time of peace is exemplified by their representative membership and long existence.

During the meeting many historical papers on Surgery and Journalism will be presented and all living past Presidents will attend. The meetings will be held at the Marlborough-Blenheim Hotel, Atlantic City, under the Presidency of Dr. Geo. W. Kosmak of the *American Journal of Obstetrics.*

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, MAY, 1919.

SURGERY AND CANCER.

Surgical interference has been deemed the best treatment for carcinoma. So thoroughly is the profession accustomed to recommend the use of the scalpel for the treatment of tumors, "precancerous lesions," and malignant growths, that there is a general impression that surgery is eminently successful in limiting the development of carcinomatous disease, if the patient undergoes an operation during the first few months of the disease.

It is interesting to note that the worth of surgery in cancer is called into question by Seelye W. Little in a critical study of the subject in the *Boston Medical and Surgical Journal,* March 13, 1919. From theoretic considerations, logically developed, and from a pragmatic test, he inquires into the general subject as to whether *a* cancer is identical with the disease cancer. Pointing out that the cause of cancer must exist everywhere, "because cancer is endemic everywhere in the inhabited world," he raises a number of almost unanswerable questions as to why cancer exists in its various forms, at different ages, and with a variety of expressions. His conclusion that "*a* cancer is neither the disease cancer nor does it contain the cause of the disease permanently, if, indeed, it ever does," serves as the basis for a second conclusion that one is not justified in claiming that the removal or destruction of a cancer will or may cure the disease.

By a grouping of facts and figures he substantiates the statement, already accepted, that the death rate from cancer is steadily increasing despite earlier operation, improved operative technic, and more radical operative procedure. It is striking that, despite our increasing surgical knowledge and practice with reference to cancer, a decreasing death rate from this cause has not been effected. Perforce, he is obliged to answer negatively the question, does surgery actually result in a lower cancer death rate than would exist if surgery were abolished as the treatment for cancer?

Various statistical data are offered to indicate that "it is fairly within the truth to say that, without surgical interference and having reference to all cancer patients, the average length of life is at least two years from the time the patient first notices symptoms of the disease." On the other hand, from figures available, he notes that the average duration of life after operation for cancer was approximately two years and eight months.

The more startling evidence adduced indicates "that the cancer death rate is higher and increasing faster in the great medical centers of this country than in the comparatively unprogressive medical centers."

It is significant to note, for example, that cancer of the skin and cancer of the breast, both liable to early discovery and to early observation by medical men, with comparatively safe operability, evidence a greater increase in their mortality rate than is found in cancer of the stomach or liver where early diagnosis is unusual and early operation rare.

It is probably not true, however, that surgical treatment and surgical prophylaxis of cancer are definitely responsible for any increase in the cancer mortality rate. Halstead is reported to claim that 38.8 per cent. of the patients with breast cancer operated upon remain well for three years or more. Wertheim claimed only 25 per cent. successful results from his operative treatment of uterine cancer. William J. Mayo is quoted as believing that less than 30 per cent. of cancer patients can hope to be cured by surgery alone.

Under the present conditions of surgery and the increased education of the public as well as of the profession the value of surgical interference is of interest. It would appear to be true that surgery may possibly prevent a few cancers and may palliate suffering in some instances and in others prolong life a few months and in a very small number of instances, for a few years.

The most suggestive comment of Little is upon the general attitude towards surgery in the treatment of cancer. He states "our teaching and practice in the matter are absolutely incorrect, because we are attacking only the symptom or manifestation instead of the disease." Recognizing, as he does, the impotence and a lack of logic in the surgical treament of cancer, he still maintains that it is in general the best treatment we have for cancer, "though a very poor best."

While this pessimistic outlook is possibly supported by much of the evidence, it is equally true that whatever optimism there may be in the treatment of malignant growths is to be found in early operative interference. If life is prolonged only a few months, there is an abundant opportunity for the victim of the disease to order his affairs, safeguard his interests, and make such adequate arrangements as may be possible for the benefit of his legatees. If suffering is decreased and renewed hopes are established, there is a value in surgery which is not to be found in the ordinary type of non-surgical therapeusis. The data as recorded is assuredly insufficient to supply facts essential for an absolute judgment as to the worth of surgery in the treatment of cancer. While occasionally spontaneous cures occur, the road of the carcinomatous individual is sad to travel, and for the most part it soon leads with certainty to the grave. The surgical cures, even though they be judged by freedom from symptoms for a period of from three to five years, are far more numerous than spontaneous cures. The prolongation of life through surgical skill if in only 25 per cent. of patients operated upon, represents that much gain in health, ability, happiness and effort.

The fact remains that despite the possibility of overemphasizing the necessity of surgery in the treatment of cancer, it continues to be the most satisfactory and effective treatment available, even though the profession itself recognizes its marked and tragic limitations.—I. S. W.

ABDOMINAL SYMPTOMS FOLLOWING TYPHOID INOCULATION.

Everyone is acquainted with the local and general reactions, sometimes severe, that follow prophylactic typhoid inoculations, but the fact that abdominal symptoms and signs may develop, affording opportunities for surgical diagnosis, is not generally known. In a recent report to the Surgeon General from Camp Custer (Review of War Surgery and Medicine, Washington, D. C., April, 1919) Lt. Col. Irons says that 27 patients were admitted to the Base Hospital suffering from abdominal pain after typhoid inoculation. In 20 the pain was generalized, in one in the lower right quadrant, in 4, in the right upper quadrant and in both upper quadrants in two cases. Of the four patients who complained of pain in the right upper quadrant, two gave a previous history of having had gall bladder disease. In the two patients who had pain in both upper quadrants, one had had a previous attack of gall bladder disease; the other gave a history of typhoid some years previously. These cases are extremely interesting as showing that the anti-typhoid injections caused a recrudescence of gall bladder disease, in one instance the typhoid etiology having been proven. Of the 20 patients with generalized pain almost all were relieved by one or two bowel movements. In a few instances the pain was ascribed to tenderness of the abdominal muscles. The signs and symptoms usually come soon after the inoculation, in most instances within the first days.

Thirteen cases of cholecystitis were admitted to the hospital during the year, in addition to those mentioned and in three of these, the onset of the acute attack followed shortly after the inoculation. On the other hand of 290 consecutive admissions to the hospital for appendicitis, in only two patients was there a suspicion that the inoculation may have caused the appendicitis, so that Irons concludes "that typhoid inoculation does not appear to have played any demonstrable rôle as a cause of appendicitis or its recurrence." He also adds, "In every case of abdominal pain, appendicitis must be considered but attention to the history and other symptoms and signs should usually result in avoidance of mistakes."

We have deemed the abstracting of this report as interesting, not only as showing a novel place of immunological relations, but also as indicating the possibility of making a mistake in surgical judgment.—E. M.

LOCAL ANESTHESIA IN CHILDREN.

At first blush, the application of local anesthesia for operations upon children theoretically seems almost hopelessly contraindicated. That is why we are much interested in a recent report of Farr (Interstate Medical Journal, Feb., 1919), who cites 77 cases, including operations upon almost every part of the body, in which this method proved successful; in only seven was it considered necessary to administer inhalation anesthesia. Farr says that relatively speaking novocain is as safe in the child as in the adult. Moreover, the psychic element is not so important in children as in adults. In very young children, restraint may be necessary, but in the majority of children over four, no mechanical restraint is necessary. Very often a bribe goes a long way in maintaining quiet during the operation. In only one case did post-operative vomiting occur, and this was in a patient with hypertrophic pyloric stenosis. It is absolutely necessary to be extremely refined in surgical technique when operating upon children under local anesthesia; rough dissection and manipulation is outlawed; Farr appropriately designates the method as "Healthy." This is especially true in the manner of handling the retractors. They must be slowly and carefully placed and not allowed to slip out of the wounds when the anesthesia is successful. The inspection of the abdominal contents is more perfect than under inhalation anesthesia, resembling that seen in the cadaver, when all the organs are flaccid. Vertical traction and tilting are used to bring the organs into view. Farr describes his method of infiltration in detail. Complete filtration of all the tissues is necessary before beginning the operation. The most important point, aside from this, is the avoidance of pain in making infiltration. This is done by making all secondary wheals from beneath, and by making subdermal rather than intradermal injections for the anesthesia of the skin." The fluid should advance into the tissue just ahead of the needle.

Local anesthesia is slowly robbing general anesthesia of much of its dangers, and if children, in whom it has hitherto seemed contraindicated, come into the field of applicability of local anesthesia, an important surgical advance has been attained.—E. M.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

Federal Aid for Handicapped Soldiers and Sailors.

Despite the efforts of the Government to be of service in re-educating disabled soldiers and sailors, there appear to be sundry difficulties in awakening them to the opportunities which the Government affords. The number of disabled and handicapped men is not large, but the responsibility of the Government cannot be satisfied until every last one has been placed under conditions leading to their reeducation, or their re-institution into industry. It is necessary that re-establishment of those injured by war should occur as rapidly as possible, and that health, strength and self-supporting ability be reconstituted.

Until his discharge from hospital care the medical and surgical treatment necessary is under the jurisdiction of military or naval authorities. The vocational training afterwards necessary to resecure potential ability for self-support is under the jurisdiction of the Federal Board for Vocational Education. If an artificial limb or other orthopedic or mechanical appliance becomes necessary, the Bureau of War Risk Insurance will supply it free upon his discharge and will renew it when such need arises. If, subsequent to discharge from the Army or Navy medical treatment be again required because of his disability, the same Bureau of War Risk Insurance will supply it without cost. Furthermore, any man whose disability entitles him to compensation under the War Risk Insurance Act may be provided by the Federal Board with a course of vocational training and preparation for a new occupation.

While the Government strongly recommends the vocational re-training and is willing to defray the expenses connected therewith, the decision to accept it is optional with each man. Herein lies the weakness, in that it is necessary to convince and persuade individuals as to the importance of taking advantage of the proferred offer of health.

The liberality of the Government is evidenced in that if the disabled elects to follow the course of vocational training provided by the Federal Board, not alone is the course furnished without cost, but the individual will be paid during the period of training a monthly compensation equal to the sum to which he is entitled under the War Risk Insurance Act, or a sum equal to the pay of his last month of actual service, whichever is the greater. In no instance, however, will a single man or one requiring to live apart from his dependents receive less than $65 a month, exclusive of the sum paid dependents, nor will a man living with his dependents receive less than $75 a month, inclusive of the sum paid to dependents. The family or dependents of each disabled man will receive from the Government during his period of training, the same monthly allotment and allowance as that paid prior to his discharge from the Army or Navy. It is patent that in almost every instance the handicapped individuals can be relieved of the serious difficulty occasioned by the disabilities, or can acquire new powers to replace any that may have been lost.

Men failing to take advantage of the opportunities to increase their skill and to prepare themselves for more highly remunerative positions will be obliged to compete with able-bodied men and thus suffer the financial handicap incident to a lower grade of industrial ability. The fact that the Federal Board, through its employment service, assists the re-habilitated men to secure positions gives an added benefit, the full worth of which cannot be estimated, in these days of difficulty in securing proper adjustment in industrial life.

The public also requires to be educated as to the necessity of accepting disabled soldiers and sailors in filling vacant positions, providng, of course, that they posess the necessary ability to fill them. Their disabilities as such should not be considered as bases for discriminaton, but full stress should be placed upon their industrial potencies. The medical profession, thoroughly conversant with the physical phases of handicap, should bear in mind the necessity of encouraging disabled soldiers and sailors to accept the liberal offers of the Government and to pursue the courses made available for more or less complete restoration to functional activity.

Communications in regard to this entire matter should be addressed to the Federal Board for Vocational Education, Washington, D. C., or to a district office of the Federal Board in the district in which the individuals may be located. The country has been divided into fourteen districts, with headquarters in Boston, New York, Philadelphia, Washington, Atlanta, New Orleans, Cincinnati, Chicago, St. Louis, Minneapolis, Denver, San Francisco, Seattle, and Dallas. Opportunities of facilitating the work of the Federal Board for Vocational Education is sufficient reason for devoting space to circulating the above information, and it is to be hoped that the cordial cooperation of the profession will be extended in this excellent work of rehabilitating disabled soldiers and sailors.

Book Reviews

Surgical Treatment. A Practical Treatise on the Therapy of Surgical Diseases for the Use of Practitioners and Students of Surgery. JAMES PETER WARBASSE, M.D., Formerly Attending Surgeon to the Methodist Episcopal Hospital, Brooklyn, N. Y. In three large octavo volumes, and separate Desk Index Volume. VOLUME I contains 947 pages with 699 illustrations. VOLUME II contains 829 pages with 761 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1918.

To attempt to compile a system of surgery is by no means a simple matter. When a single author, however, endeavors to unify his system by excluding therefrom the assistance of various contributors, he undertakes a monumental task. Considered from this standpoint, Dr. Warbasse has been eminently successful. He has presented a splendid, well-balanced, excellently organized work, thoroughly abreast of the demands of modern surgery. Most striking is the fact that behind the excellent subject matter is the underlying thought that surgery is merely a means to an end, that surgical technic is merely a tool to be utilized in the interest of human beings. Furthermore, the spirit of the author is reflected on every page as that of a teacher who desires to inspire his students. He is not a slave to tradition, and, therefore, studiously suggests originality in procedure instead of dependence upon cut-and-dried technical formulae.

The literature of surgery has been thoroughly studied and has been cleverly collated so as to promote smoothness in presentation. There has been frank acknowledgment of credit where necessary, although the names of discoverers of methods and instruments have been intentionally rejected because of the objection of the author to "proper-name nomenclature." As a believer in co-operation, surgery is presented as a product of harmonious effort, born of a desire for mutual aid in the advancement of human welfare. At the same time, sufficient credit has been given by name or quotation to the work of surgeons throughout the world in so far as was necessary in carrying out the policy of integrating surgical accomplishments without an assumption of egotistic superiority.

Volume One deals with the general of surgery and includes discussions of surgical materials, anesthetics, wounds and operations, and then takes up in an orderly way the general subjects of inflammations, surgical fevers and infections, blood and blood vessels, diseases of the bones, dislocations, diseases of the joints, operations on bines, joints, tendons, fasciæ, bursæ, skin and its appendages, and the nerves.

Volume Two is devoted to surgical treatment of the head, spine, neck, thorax, breast and abdomen.

Laying aside the question of the method of handling the subject matter, the most striking feature of the two volumes thus far issued consists of originality. The illustrative material is new, plentiful, excellently and artistically developed and arranged. No system of surgery today has received more careful and thorough study of the art of presentation. Old illustrations of former generations are lacking. The artistic skill of the twentieth century is everywhere evident, from the simplest line drawing to the most detailed illustration which has demanded the skill of capable artists. The publishers have co-operated by presenting a typography thoroughly harmonious with the spirit of the author, so that from the preface through the index they have provided a work considerably above the average for medical publications.

As a whole, the dominant idea of practical and original presentation is constantly in evidence. Warbasse has been successful in offering a personal system of surgery, built upon the accomplishments of the long line of surgeons whose efforts have built up modern surgery. He has accepted what he regards as the well-founded therapy of the past and combined with it the essential principles of the newer modes of treatment, still under trial, without seeking to afford surgical novelties, and without discriminating against technic, either because of youth or age. His efforts merit success commensurate with his labors, his enthusiasm, and his skill as a writer and a surgeon. He has successfully developed a "system" of surgical treatment which must commend itself to practitioners and students of surgery as an up-to-date, thorough, practical, and inspiring treatise on surgical treatment.

Surgery in War. By ALFRED J. HULL, F.R.C.S., Lieut.-Col. British Army Medical Corps; Surgeon, British Expeditionary Force, France; Late Lecturer on Surgical Pathology, Royal Army Medical College, Milbank; and Surgeon, Queen Alexandra Military Hospital. With a preface by LIEUT.-GEN. T. H. J. C. GOODWIN, C.B., C.M.G., D.S.O., Director General, Army Medical Service. *Second Edition*, 624 pages with 210 illustrations. Philadelphia. P. BLAKISTON'S SON & Co., 1919.

This is a fine contribution to the subject of military surgery and, practically, brings the subject up to date. The subjects discussed include wounds in general, and wounds of the face and jaws, the chest, the abdomen, the peripheral nerves, and the bones, in particular. Anaerobic infections, including tetanus, are described separately; the bacteriological descriptions of the various anaerobes found is particularly good, and an excellent comparative chart of the biological tests for distinguishing the groupings is appended. Perhaps a little more detail in the descriptions of the various apparatuses for the treatment of fractures, joint injuries, etc., would be desirable. Throughout the book the geatest attention is given to therapy.

The additional contributors to this volume include Pilcher, Miller, Browning, Petrie, Richards, Jocelyn Swan and Tracy.

Books Received

The Disabled Soldier. Douglas C. McMurtrie, Director, Red Cross Institute for Crippled and Disabled Men; President, Federation of Associations for Cripples; Editor, American Journal of Care for Cripples. With an Introduction by Jeremiah Milbank, Vice-Chairman, Committee of Direction, Red Cross Institute for Crippled and Disabled Men. New York: The Macmillan Company, 1919. Pp. 232.

Roentgenotherapy. Albert Franklin Tyler, B.Sc., M.D., Professor of Clinical Roentgenofogy, John A. Creighton Medical College; Attending Roentgenologist, St. Joseph's Hospital; Bishop, Clarkson Memorial Hospital, Ford Hospital, Immanuel Hospital, Douglas County Hospital, and Lord Lister Hospital, Omaha, Nebraska; Member American Roentgen Ray Society; Fellow American Medical Association, Etc. With illustraions. St. Louis: C. V. Mosby Company, 1918. Pp. 162.

Squibb's Atlas of the Official Drugs. William Mansfield, A.M., Phar. D., Dean and Professor of Pharmacy and Botany, Union University, Department of Pharmacy, Albany, N. Y.; Late Professor of Biology and Pharmacognosy, College of Pharmacy of the City of New York, Columbia University, and Botanist and Pharmacognosist to E. R. Squibb and Sons; etc. Published by E. R. Squibb & Sons, New York.

Proceedings of the Royal Society of Medicine. Edited by J. Y. W. MacAlister, Under the Direction of The Editorial Committee. *Volume the Eleventh.* Session 1917-18. *Section of Anesthetics.* London: Longmans, Green & Co., Paternoster Row, 1918.

Essentials of Surgery. A Textbook of Surgery for Student and Graduate Nurses and for those Interested in the Care of the Sick. Archibald Leete McDonald, M. D. The Johns Hopkins University. Formerly in charge of Department of Anatomy, University of North Dakota; Lecturer on Surgery, Nurses Training School, St. Lukes Hospital, Duluth, Minnesota. 46 illustrations. Philadelphia and London, J. B. Lippincott Company.

United States Naval Medical Bulletin. Published for the Information of the Medical Department of the Service. Issued by The Bureau of Medicine and Surgery, Navy Department, Division of Publications. Report on Medical and Surgical Developments of the War by William Seaman Bainbridge, Lieutenant Commander, Medical Corps, United States Naval Reserve Force. Washington Government Printing Office, January, 1919.

The Operative Treatment of Chronic Intestinal Stasis. Sir W. Arbuthnot Lane, Bart., C. B. Consulting Surgeon to Guy's Hospital, and to the Hospital for Sick Children, Great Ormond Street. *Fourth Edition.* Revised and Enlarged. London, Henry Frowde, Hodder & Stoughton. Oxford University Press. Warwick Square, E. C. 1918.

Complete Index to Volumes I, II and III of Warbasse's Surgical Treatment. Philadelphia and London: W. B. Saunders, 1919.

Progress in Surgery

A Résumé of Recent Literature.

A New Incision for Appendectomy. Leigh F. Watson, *Annals of Surgery*, October, 1918.

The number of incisions that have been brought forward for appendectomy from time to time, show that no one incision is adapted to all cases. Many writers have noted that in the cadaver the base of the appendix is found at McBurney's point, while in the living subject it is below this point, usually on a level with the center of Poupart's ligament. A number of operators have called attention to the ease with which the appendix can be removed when operating for right inguinal hernia. Since 1910, I have used a new incision, with its center over the base of the appendix, and believe that in many cases it is an improvement over those in general use.

Incision: A point one and one-half inches from the right anterior superior spine, on a level with a line connecting the two superior spines, is selected for the beginning of a vertical incision which extends directly downward for two to three inches to a point just above, and to the inner side of the internal abdominal ring.

Advantages: Traction to expose the appendix is avoided, because of this incision, in the external oblique and its aponeurosis, the most resistant structures, is directly over the base of the appendix. It can be enlarged without weakening the abdominal wall. The ilio-hypogastric and ilio-inguinal nerves are not injured because the incision lies between them. Because this incision is made over the cecum, the small intestines do not crowd into the wound as they do when the McBurney and lateral rectus incisions are used.

Hyperplasia of the Appendix. D. Symmers and M. Greenberg, *J.A.M.A.*, Feb. 15, 1919.

Attention is called to the lymphoid hyperplasia of the appendix in their records in Bellevue Hospital in the examination of several thousand appendixes. This condition was found to predominate in about 10 per cent. of the whole, by microscopic study. Twenty of the cases have been specially studied, ten boys and ten girls. The patients had complained of spasmodic recurring pains or pain and moderate tenderness in the region of McBurney's point, lasting for several hours or days. Muscular rigidity, if present, was not easily marked. Nausea was not uncommon, but vomiting was rare. The temperature was always normal and the pulse rarely above 80 or 90. Headache and constipation were fairly common. Naked eye pathologic changes were not seen, but the microscope revealed the conditions. The occurrence in the germinal follicles of degenerative lesions of the sort described is best explained as a histologic indication of status lymphaticus. These degenerative foci have previously been seen by other observers, Lartigau and Blumer. The authors describe the signs of the lymphatic constitution and point out its dangers, using as an incident the death from antitoxis of Langerhan's child about thirty years ago, though some of the patients may be capable of withstanding both injuries and infections to which others succumb. The bodily characteristics of the lymphatic constitution have been known for some time, but have been largely ignored, as such inspection does not hold as high a position among diagnostic methods as it formerly did. In the clinical conglomerate of scrofula, Gross long ago pointed out the angelic child which he attributed to the lymphatic constitution, and after puberty the condition is still more easily recognized. Summing up their paper, the authors conclude that: "There is a clinically recognizable syndrome referable to lymphoid hyperplasia of the appendix, attended by degenerative or necrotic lesions in the germinal areas, with or without sclerosis of the interstitial tissues of the submucosa. The syndrome is marked by repeated attacks of appendical colic, occurring at intervals of days, weeks or months, but is not accompanied by noteworthy changes in pulse, temperature or blood count, and is encountered most frequently in children or young adults. It is probably peculiar to subjects of status lymphaticus."

Migratory Appendix. J. E. ALLABEN, *J.A.M.A.*, March 8, 1919.

After remarking that certain tumors in the abdomen, having been removed from one place to another, have their nutrition maintained by new blood vessels of the adhesion, he reports a case in which the appendix had been entirely displaced as a result of gonorrheal inflammations and had to be dissected out from its adhesions. It was entirely separated from the cecum and had been kept alive by new blood vessels that it had formed. It is difficult to say, Allaben remarks, whether the appendix or the tube was the primary offending organ. The latter was leaking pus continually, causing the intestinal adhesions. The patient made a good recovery after the operation for the removal of the appendix, excepting a slight skin stich adhesion. Allaben's opinion is that these adhesions would have gradually been absorbed, but it is easy to see that a tube leaking puts into the peritoneum might cause trouble. The condition of the appendix, here found, may account for some cases in which it is reported missing.

Secondary Jejunal Ulceration. CARNETT WRIGHT, *British Journal of Surgery*, January, 1919.

Where the preliminary operation has been an anterior gastro-enterostomy, with or without entero-anastomosis, the gastro-enterostomy should be undone—the opening in the stomach closed in the usual way and the small intestine dealt with as indicated. When pyloric stenosis is present, a large no-loop posterior gastro-enterostomy should be made, employing catgut sutures. Whenever possible the conditions should be restored and the stoma done away with. When a stenosis is present at the pylorus, the last condition can be accomplished by doing the Finney operation. In all cases postoperative care as regards diet, etc., should be exhibited for a long time.

A Procedure for Avoiding Colostomy and Colectomy. A. RENDLE SHORT, *British Journal of Surgery*, January, 1919.

This is directed towards improving the technic in intestinal obstruction. The procedure consists in dividing the ileum several inches from the valve, doing an end-to-siide anastomosis with the sigmoid by Murphy button, and bringing the proximal end of the ileum up to the skin. The procedure has also been applied in visceroptotic conditions.

The Treatment of Hypertrophic Stenosis in Infancy. OLIN W. ROWE and WM. A. COVENTRY: *Journal-Lancet*, March 15, 1919.

Medical treatment should be offered in all cases of congenital hypertrophic stenosis until it has been definitely determined that surgery is necessary. The symptoms which demand surgical intervention are rapid loss in weight, persistent forcible vomiting, and active gastric peristalsis. The roentgen ray and duodenal catheter reveal nothing not easily discovered by simple physical examination, and are not without danger.

In the Cure of Prolapse of the Uterus. A. M. JUDD, *American Journal of Obstetrics, etc.*, February, 1919.

Judd believes that after an employment during the past five years of the Sems-Emmett-Baldwin combined procedure with uniformly good results, he can practically guarantee a cure to any patient suffering from uterine prolapse. Also, that any operation requiring the opening of the abdomen from above is unnecessary surgery.

His technic is as follows: Make certain that uterus is replaceable and retainable—there should be no complicating adhesions, old exudites or other lesions which tend to defeat the mechanics of the operation. Patient is placed in the Sinis posture on a table which has its head lowered—bind legs and feet together with a wide bandage to retain this position. After the introduction of a self-retaining Cleveland speculum, any other necessary procedure is gone through, such as trachelorrhapy, aerretage, etc. The cervix is then drawn forward into the hollow of the sacrum, throwing the fundus into exaggerated anteversion. These denudations are made after pushing up the cystocele for better observation. The first denudation is in the left lateral or lower original suleus, selected by using a sharp hook and picking up a point in the suleus a little posterior to what would be the normal position of the cervix. The denudation should be about one-half by three-fourths of an inch in axes, the larger diameter being in line with the long axis of the vaginal tube. A similar point is then chosen in the right or upper vaginal suleus, and then the third denudation is made on the anterior vaginal wall at its center with the posterior extremity about one-half inch in front of the cervix, of the same length as the other denudations but wide enough to take care of the lateral denudations which are subsequently brought together at this point; this transverse diameter is usually about 1½ times that of the lateral ones. The lateral contiguous margins of the denuded areas are then brought together by a fine running suture, so that finally a half-moon is formed as a denudation. Two or three silver-wire sutures are then inserted under the denuded areas, bringing them all together in the center, and after pressure is made on the central denudation, they are then twisted together so that an artificial pessary or box is formed in front of the cervix.

Two crescentu folds now extendinig from the base of the urethra to the more external of the silver-wire sutures on the anterior vaginal wall are then denuded and their proximal margins united with plain fine gut and the spread out, denuded areas united by fine silver wire, the sutures then being passed as previously except that they are so arranged as to draw the vaginal wall with the cystocele upward toward the cervix. Three to six sutures are required for the cystocele proper; they are twisted and cut shorter than the others. Several illustrations are shown which are from Balwin's original article.

Several additional suggestions are made regarding possible complications, and mistakes. Seventy cases, with absolute success, have been operated upon so far by this method by the author.

A Series of Cases of Cesarean Section. A. C. BECK, *American Journal of Obstetrics, etc.*, February, 1919.

Although much has been written concerning the too frequent use of Cesarean section as a means of overcoming obstetric difficulties, it is at times the best means of obtaining a good result in serious obstetric difficulties other than marked disproportion, especially when the dangers of the cruder methods—version, crancolamy and decapitation, forceps on the unengaged head, etc., are considered; even though mortality may not occur, infection and trauma are so great as to make it absolutely essential for difficult and dangerous gynecological operations to be performed to relieve them. Beck uses a modified Krönig operation which he describes minutely, having several illustrations also. The principle of his modified technic is to completely seal off the peritoneal cavity from the closed uterine incision so as to place a definite barrier in the path of those infections which reach the peritoneum through infection of the wound in the uterus. This is accomplished by the lapping of the peritoneal flaps. In his personal series of 37 cases there was only one death, probably due to eclampsia. When the operation is done before term there is great danger of losing the premature infant—it should not be performed in the interest of the child in such cases.

The Visitations of Influenza and Its Influence Upon Gynecologic and Obstetric Conditions. L. K. P. FARRAR, *American Journal of Obstetrics, etc.*, February, 1919.

After a discussion of the history of influenza and its effects, Farrar makes an analysis of the results of influenza upon gynecologic and obstetric conditions and concludes that mild attacks have no influence upon them. Severe attacks, however, produce menorrhogia and exacerbations of chronic gynecologic conditions. They often cause abortions, premature delivery, or still birth. Labor is prolonged and tedious, the lahea is bloody and involution is slow. Pregnancy has an unfavorable influence upon the course of bronchitis or pneumonia in influenza. Induction of labor has no beneficial effect upon the course of influenza. The chances of general infection are greater if influenza occurs during the puerperium and puerperal sepsis must be differentiated.

The Treatment of Sepsis. R. J. Behan, *American Journal of Obstetrics, etc.*, February, 1919.

Behan discusses the various methods of therapy and their utilization and makes the following conclusions:

I. Sodium bicarbonate or bicarbonate has a definite place in the treatment of infections, seeming to be almost specific in the early stages of sepsis and pneumonia, but is apparently contraindicated in the later stages. When used in the early stages, intravenous injection is best. If glucose solution is used in the later stages of pneumonia, it should be used alone; if it is to be used in the early stages it may, because of the increased viscidity of the blood, hinder the exudation.

II. Salvarsan is also of value, especially in septicemia.

III. Vaccines are of use in certain cases and in all obstinate cases should be exhibited autogenous and massed vaccines may aid where stock vaccines fail. Overdosage of the vaccines seems to have a deleterious influence.

IV. Anti-streptococic serum is of great value in streptococcic infection, producing wonderful and immediate results. It should not, however, be given on a falling temperature and if the temperature remains stationary it should be given only in greatly reduced doses. A chill following its administration is not a bad omen. Small preliminary injections should be given as a dose for serum sickness—large initial doses should be given, however, in all cases.

V. Transfusions are of distinct value in sepsis, especially in those cases of falling blood pressure. Severe reactions follow at times and should be guarded against by small and repeated injections. Antitoxic blood may be produced in the donor by previous vaccine treatment.

The treatment of sepsis varies according to the stage of the disease. He divides it into three stages: early, developed, and recovery.

In the early stage there is a high pulse for which cardiac stimulants are indicated—digatol, strychnine, and strophantus found best. For the low temperature, especially those which are subnormal, the patient should be well wrapped and external heat applied. Low blood pressure should be counteracted by vasomotor stimulants, as pituitrin, strychnine, ergotin, eserine; by transfusion of blood or salt solution, or sodium bicarbonate, or sodium bicarbonate and glucose. As soon as the primary shock is overcome, prophylactic or resistance increasing measures should be instituted—vaccines in the early stages before a polymorpronualear increase has occurred, and later the use of an antitoxin. If it is a streptocaccic infection, antiserum should be given immediately because of the immediate danger of death.

The later stage—the developed—where the sepsis is clearly seen, may be divided into a stage of toxemia and a stage of septicemis. In the toxemia, the first thing to do is to remove the cause of the septic infection. At the same time efforts should be made to counteract the toxins by increasing the resistance of the organism by forced feeding of highly nutritious and palatable food, plenty of fresh air and sunlight (especially sun baths). In addition, the toxemia is neutralized by proper antitoxins, the use of alkalies in the form of sodium bicorbonate alone or in combination with glucose by mouth, or what is much better, by enteroclysis, hypodermoclysis, or intravenously, the giving of large quantities of fluid by mouth, by rectum, hypodermoclysis or intravenously and the transfusion of blood in severe cases. Cardiac and vasemotor stimulants, such as digatol, strophanthus, strychnine, camphor, pitutrin ergotin, eserine, etc., are given in addition. Recovery may occur very quickly in this stage by the removal of the infecting focus and by the counterization of the taxemia by the above methods. A marked lemorytoris is present as a rule. The blood pressure is not markedly decreased. In the septicencia all the measures used against the toxemia should be used. In addition, antiseptics, such as bichloride of mercury and salvarsan, should be injected directly into the blood stream. This stage is most serious and the patient is in the greatest danger, especially so when a polymorphonuclear decrease is followed by a leukopenia.

In the stage of recovery, the treatment should be of a supporting character, i. e., rest, both mental and physical, good food, fresh air and sunshine.

Influenza in Its Relation to Pregnancy and Labor. P. B. Bland, *American Journal of Obstetrics, Etc.*, February, 1919.

Medical science has stood impotent and practically helpless in many instances, but more especially in the cases of women in the various stages of pregnancy. Certain factors stand out prominently: the enormous number of persons afflicted, the pulmonary complications, the high degree of mortality, the unusual disturbance in the functions of the female generative organs, the susceptibility of pregnant women, the high percentage of abortion and premature labor in these women, and the extremely high mortality occurring in these subjects. Pregnancv increases the susceptibility of women to nearly all the acute infections with the probable exception of cholera and scarlet fever, and, in addition, mortality is greatly increased. The cause of the disease does not differ from that seen in the non-pregnant. The disease is distinctly a contact infection in the mother, and so whatever is to be accomplished in view of our present knowledge, must be done by early and complete isolation. The prognosis depends upon the type of infection, its severity and extent of complications—practically all mild cases recover with the continuation of the pregnancy.

Caliper Treatment. D. W. Crile, *Journal American Medical Association*, March 15, 1919.

The author discusses certain points of the treatment of fractures of the femur by the caliper method, introduced into general surgery by Lieut.-Col. Besley, U. S. A., and recommends it very highly. The value of the caliper in these cases lies in the fact that a direct force can be applied to the bone without damaging it and without penetrating its cortex. The penetration of the cortex implies misuse of the instrument or a defect in its construction. The original instrument is better than some of its modifications. Penetration of the cortex depends on several factors, but chiefly on the shape of the caliper points. A long thin taper is the worst. The relative length of the handle arm is also important, and when the handles widely diverge the chance of penetration is greater. The arrangement of the cords at the handle ends has also much to do with the pressure. The position on the femur is another great factor. But most important of all is the joggling or constant vibration, transmitted over the pulleys by the ropes and instigated by the body tone and movements. Gross movement is not referred to, but a constant fine vibratory one, such as that produced by boring, with a blunt instrument. In Crile's experience it has never been necessary to bore small holes into the bone to hold the calipers. The pressure on the points must be steady, and any variation of the pull on the ropes means pain, erosion or penetration of the cortex, or all three together. The most important points to be borne in mind are: (1) a short, broad tapering point, (2) the prevention of very slight joggling, (3) application to the hard portion of the bone, (4) low leverage (short handle ends not diverging too much), and (5) check appliances. There are several kinds of check appliances in use, the purpose of which is to check penetration by putting a stop between the handle ends of the calipers to prevent the points coming too close. This, however, does not prevent the one point from penetrating when the other is pushed away from the bone and slips. Crile finds more satisfactory a screw locking both approximation and spreading. The question of corrosion of points does not apply to short heavy ones, which could not in many months corrode enough to do harm. The disadvantages in the use of the caliper are, Crile thinks, vastly outweighed by the improvement in length, early union, good position and clearing up of sepsis, decreased number of cases of acute medullary osteomyelitis, stiffness and stiff ankles, and pressure paralyses of the external popliteal nerve. The drawbacks that cannot be avoided otherwise have been met by designing a caliper permitting the pull to be taken from the sides and allowing the knee to be fully extended. It has, however, the objection of being more expensive. Crile describes the method of applying the calipers which he has found most satisfactory. The fracture itself is an important factor in deciding the point of application, and much may depend on the direction of the pull. The rule is to pull in the direction of the long axis of the bone, except in duly considered exceptional cases. The amount of pull will vary according to the amount of shortening to be overcome, the strength of the muscles, the age and site of the fracture, the amount of swelling and tenseness of the deep fascia, and the degree of the infection. "It is my custom to apply 15 pounds directly. If this promises, after twenty-four hours, to stretch the fractures sufficiently, it is enough. If it seems not to perform its function, which can be from ¼ to 2 inches per day, it is increased to 20 pounds, which is sufficient to stretch almost any fractures full length, provided the apparatus is correct. One need not hesitate to use 25 pounds, or even 30 pounds for a few days, and often forcible reduction under an anesthetic may be resorted to. If the extra weight causes periosteal pain, it can be reduced. One finds that 10 pounds is the least that avails fully, although others can get results with only 5 pounds, I am told. However, one aims to get a little overlength inside a week and thereafter to hold this gain by tie-on fixed extension, which in reality takes very little pull once overlength is accomplished." The caliper will probably cause some discomfort the first forty-eight hours and perhaps at a later period. Relief can often be given by a little local anesthetic applied near the point of the caliper, such as a pinch of powdered procain on the dressing. Or a temporary reduction of the weight, if it can be done without slipping, will help. The method is applicable to bones other than the femur, such as the tibia, fibula and humerus, and others have had success in these cases. The illustrations are useful in making clear the description of the methods.

Severe Acute Sprains of the Knee Joint. Maynard C. Harding, *Journal of Orthopedic Surgery*, March, 1919.

In the treatment of these conditions the following points are important: (1) careful diagnosis of type of sprain: (2) aspiration of any distended joint promptly, since all effusions absorb slowly; (3) prevention of joint capsular distention, since that is one of the causes of later weak knees; (4) early baking and massage; (5) strict supervision and manner of returning to use.

A Study of Buried Bone. John F. Cowan and Leonard W. Ely, *American Journal of Orthopedic Surgery*, February, 1919.

A fragment of bone embedded fresh in the muscle of the animal from which it had been removed does not disappear for a long time. Absorption is the rule in the interior; at the circumference it may be replaced by fibrous tissue. The actual method of absorption is oftentimes difficult to determine; there are no giant cells, no leucocytic infileration, no increased vascularity of the marrow. The death of the bone tissue is the rule. A patella with all its coverings does not resist absorption better than a bone fragment with exposed marrow. The narrow has a tendency to become fatty and fibrous although patches of lymphoid tissue may persist.

Cartilage becomes eroded and is replaced by fibrous tissue; or it disappears in areas.

Roughly the changes in bone and cartilage resemble those of an atrophic or proliferative arthritis.

The Treatment of Chronic Osteomyelitis Due to Gunshot Injuries. C. F. Eikenbary, *American Journal of Orthopedic Surgery*, February, 1919.

The aim of the operation is to get rid of all necrotic bone; to avoid leaving any cavity at all; to avoid spiculus, rough areas, etc. The writer's cases all healed in four weeks. In a general way this corresponds with the technic used for osteomyelitis of civil life.

La Contusion de l'Os Spongieux Par Projectiles de Querre. (Contusions of Cancellous Bone by War Missiles.) De Gaulejac and Nathan: *Revue de Chirurgie*, May-June 1918.

The study resulted in the following conclusions:

Wounds of cancellous bone are not productive of any local symptoms, which latter, however, appear with the local complications and have a rather slow onset. In general the local complications are not proportionate to the extent of the bony changes. A hyperacute or subacute development indicate a massive inflammatory destruction of bone; fever is the most prominent symptom, and its appearance should create suspicion of an inflammatory process. A septicemia is present and may persist after surgical healing; the only indication of the latter may be an elevation of the pulse. A negative blood culture does not imply a local healing but a positive one indicates a local focus.

The Operative Treatment of Ruptured Internal Lateral Ligament of the Knee. T. P. McMurray, *British Journal of Surgery*, January, 1919.

The usual operation of pleating of the ligament is frequently followed by recurrence of the disability. The operation recommended is as follows: When present a ruptured semi-lunar cartilage is removed. The essential part of the operation consists in advancing the tendon of the sartorius muscle forwards to lie over the internal lateral ligament, where it is made to lie in a groove in the lower end of the femur and in a slit in the internal lateral ligament. This does not interfere with the normal movements.

Displacement of the Mandibular Meniscus. J. Hogarth Pringle, *British Journal of Surgery*, January, 1919.

Pringle discusses the mechanism by which this rather uncommon accident occurs. Usually it results from overaction in closing the mouth after some excessive action as yawning. The method of reduction is described. The accident, once it has happened, can be repeated. The pain and discomfort is due to pressure on the cartilage.

The Transplantation of Bone in the Repair of Cranial Defects. Charles H. Gilmour, *Surgery, Gynecology and Obstetrics*, September, 1918.

The following benefits follow the operation: Depression leaves, and patient becomes optimistic and bright. Headaches improved in all cases; entirely absent in large percentage. Memory improves; dizziness disappears. Eyesight improves, the blurring of vision disappears, and the color fields increase. The man ceases to be a permanent ward of the state and becomes a useful citizen, capable of carrying on any ordinary occupation.

Superficial Burns. H. G. Weiskotten, *Journal American Medical Association*, January 25, 1919.

With the design of pointing out the bearings of necropsy findings after death from superficial burns, Weiskotten reports his personal observations in ten fatal cases, as bearing on the question of a fatal toxemia. He reviews Bardeen's previous observations which indicate a circulating poison in the blood. Weiskotten has studied ten cases, the patients' ages varying from 19 months to 60 years, and the burn causing death from within a few hours to twenty days. In all cases large areas of the body surface were involved to a varying extent, but in none was there any evidence of charring. The most prominent and characteristic lesions were seen in the suprarenals which were markedly swollen and deep red. Microscopic examinations showed marked congestion of the blood vessels and possible evidence of hemolysis and thrombi. In cases of duration of less than twenty-four hours the changes were less prominent, but the lesions in general were comparable to the central necrosis occurring in the liver of the guinea-pig in chloroform poisoning, except that they were more diffuse. As far as he knows no other condition produces similar changes in the suprarenals. In the spleen the gross appearances were not marked, unless it was that the splenic noduls appeared rather prominent in some cases. Microscopically in all the cases of less than three days' duration, there were characteristic lesions in the lymph nodules, edema and apparent necrosis of the germinal centers. In later cases there were corresponding lesions in distribution and the appearances suggested that the areas represented earlier lesions in the process of hyaline degeneration and resolution. In the blood sinuses, there was what might be in some cases indications of thrombi and hemolysis, but these were not definite. In the lymph nodes, generally, the changes correspond to those described in the spleen. Their involvement, regardless of location, and the involvement of the germinal centers of the nodules suggest a poison in the circulating blood, brought by way of the lymph stream. In two cases there were areas of hemorrhage under the endocardium of the left heart ventricle, and microscopically, evidence of injury to the muscle fibers, comparable to the lesions of the heart in diphtheria and other severe toxemias. The kidneys showed no gross change microscopically, but microscopically in four cases there were fibrin thrombi in the apillaries of the glomerular tufts, and in four cases of more than two days' duration, there were minute hemorrhages in the mucosa of the stomach and intestines, and in the case of twenty days' duration punctate ulcers were present. No constant gross changes were observed in the liver, but, microscopically, in two cases foci of necrosis of liver cells were evident. In the two-day cases there were punctate hemorrhages in the epicardium. Moderate congestion of the lungs occurred in the two cases, and edema in two others. In three cases there was definite congestion of the abdominal vessels. A definite pathologic condition was evident from the necropsy findings generally, indicating a poison by toxins circulating in the blood as an important factor of the fatal result. Weiskotten does not discuss the question of so-called shock in these cases

The Relationship Between Tonsillar Infection and Recurrent Vomiting. Rood Taylor, *Minnesota Medicine*, February, 1919.

In forty-seven cases of recurrent vomiting in children, there were forty cases in which there was evidence of tonsillar or adenoid disease. In six of the twenty-four patients whose tonsils and adenoids were removed, no further information could be secured. One of the remaining eighteen patients is unimproved. Five are very much improved, and twelve have had no attacks since operation, this period varying from seven months to six years.

Contribution to the Study of Rhinoplasty. Professor E. J. Moure, Bordeaux. *Annals of Otology, Rhinology and Laryngology*, December 1918.

After giving due credit to the rhinoplastic work of Nelaton and Ombredanne the author calls attention to the fact that war mutilations are much more extensive and bizarre than those caused by disease or as the result of operative procedure. Bony framework as well as soft parts are destroyed and in many cases there are thick cicatricial keloid tissues to be removed before success can be obtained. Bullet wounds are usually simple and not very destructive but those caused by shell or grenade splinders cause extensive and deep mutilations. These wounds heal with thick and adherent scars which it is usually best to remove and to borrow healthy tissue from the neighboring parts. The skin of the forehead lends itself well to this.

Several operations must be done. The first part of the reconstructive treatment contents itself with the closure of the artificial openings and the restoration of the soft parts and the bony framework. The greatest care should be observed by those who give first aid to these patients to preserve the natural passages and orifices. The esthetic results then are almost secondary in importance.

A case is reported in detail with illustrations that show the procedure better than any amount of description can. There was a loss of nasal substance beginning at the middle of the nose and within 1 cm. of the intersuperciliary line extending outward and downward toward the left ala. The bones of the nose on the left side of the nasal floor were destroyed. The septum was bent and perforated and the left maxillary sinus opened. A series of operations, five in number extending over a period of fifteen months gave an excellent functional and esthetic result.

The author observes that each case must be taken individually, subject to a general method but with many special and specific applications.

A New Camp Disease of the Larynx: "Pneumococcus Ulcerative Laryngitis." Frederic D. Owsley, Capt. M. R. C., Base Hospital, Camp Travis, San Antonio, Texas. *Annals of Otology, Rhinology and Laryngology*, Sept. 1918.

A hitherto undescribed condition of the larynx resembling syphilitic ulcerative laryngitis in which the most constantly present organism is the pneumococcus. The author names it, therefore, pneumococcus ulcerative laryngitis. One hundred and twenty cases were observed at the Base Hospital at Camp Travis. The majority of the patients give a history of exposure to the elements tho a few had had measles, mumps or pueumonia previous to the onset of the laryngological condition. During the time that these cases were observed there were a large number of cases of pnumonia at the camp and in the hospital. Many of these patients were suffering with complications involving the ears, nose or throat.

The most constant symptom is aphonia. It was present in 85% of the patients. Hoarseness may be the only symptom. In many cases the aphonia is of long standing, some have remained aphonic during six months of observation. Laryngeal examination shows symmetrically opposed ulcerations of the mucosa of the anterior third of the cords. The ulcers are elliptical in shape, situated on the superior surface of the cord and involve the free border. In certain cases the ulceration is more extensive and may run the entire length of the cord. In these cases, due probably to freer drainage of the ulcerated areas, hoarseness rather than aphonia is the predominating symptom. In many cases aphonia persists after the healing of the ulcers. This is due to a persistent paresis of the transverse arytenoid muscle.

Treatment consists in the application of silver nitrate to the ulcers beginning with 2% and increasing to 5%. Farradization is employed to combat the aphonia.

The Clinical Manifestations of Empyema. Captain Warren T. Vaughan, *M.R.C., U. S. Army, The Journal of Laboratory and Clinical Medicine*, December, 1918.

The signs and indications for empyema may vary with each case. Vaughan groups the empyema cases he has met in nine different classes, viz.: 1. Primary empyema; the history, signs and course are clear. 2. Precocious empyema; this disease develops after frank lobar pneumonia and may be present as early as the first day after the development of the pneumonia. 3. Cryptic empyema; empyema may be present (even with the type of bronchopneumonia prevalent during the present influenza epidemic) and its signs masked. However, diminished breath-sounds with flatness should call for diagnostic aspiration. 4. Massive empyema; this condition occurs infrequently. 5. Suppurative polyserositis. 6. Interlobar empyema. 7. Juxtamediastinal pus. 8. Polylocular empyema. 9. Latent empyema. All present rather a distinct picture according to Vaughan. For the last five type the x-ray is particularly valuable in making a correct diagnosiis.

Les Fausses Actinomycoses (False Actinomycosis). H. Gougerot, *Revue de Chirurgie*, May-June, 1918.

Gougerot concludes from his study that the typical appearances of actinomycotic lesions of the face, neck, thorax, fingers, and of the skin and bone can be simulated by certain microbic infections of the skin, by syphilis, by cancer complicated by infection, by tuberculosis and by certain infections the etiology of which is still undetermined. The diagnosis of actinomycosis must be made by demonstrating the parasite in the secretions, or by the serological methods of Widal and Abrami.

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ANEURISMS.*

Report of Cases.

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Since 1908 I have treated numerous cases of aneurisms, the majority of which represented nothing extraordinary or worth mentioning.

It has been stated that aneurisms may be as small as a millet seed and as large as a foetal head, and I believe that the cases which I shall report bear out this statement. The cases which have been of interest to me are as follows:

One arterio-venous aneurism of left subclavian, one right subclavian, one external iliac and one of a branch of the hepatic artery. Two of these cases were due to syphilis and two to trauma.

Case No. 1. Arterio-venous aneurism of subclavian artery. Mr. A., age 26 years. Operated upon 1908. Two years prior to that date he was shot accidentally in the axilla leaving small shot and powder burns in the axillary space. About six months prior to operation the patient suffered much pain in the axillary and pectoral regions, and an enlargement was noticed just under the pectoral muscle; the musculo-spiral nerve was paralized, due to the contraction of the fascia in axilla. There was a distinct murmur heard with each pulsation; this was the aneurismal bruit. The subclavian artery was ligated in the third division and the axillary vein was also ligated, and the nerves freed so that the innervation was also much improved. This patient made a good recovery and was living the last time I heard from him.

This operation could have been done after the ingenious method of Matas, had I been familiar with his technic.

The second case in order of operation was in 1909. This patient was a young man—a bricklayer by trade—who had, about two years previously been shot with a 32-caliber pistol. About three months prior to his entrance to the hospital he was confined to his bed and treated for rheumatism. He later developed a large mass in the right iliac region which was very painful. He ran a temperature of 103° to 104° for several days prior to his admission to the hospital. There was no expansile pulsation, as is usual in these cases and the sac was infected and inflamed. Here is where the real difficulty of diagnosis arises and the surgeon gets into trouble.

The internes brought this patient to the operating room with a diagnosis of a psoas abscess. The abdomen was opened; the tumor was well surrounded by gauze packs. A free incision was made in what was thought to be a psoas abcess. A great gush of blood instantly revealed the true nature of the case. It was through presence of mind and prompt action that the patient's life was saved. I quickly packed the sac with six square yards of gauze and the hemorrhage stopped, to my delight and surprise. Keen's surgery only mentions five yards of gauze used in packing the sac, but when I reported this case to Dr. Matas, I did not know that I had left one yard of gauze in the sac, which was discovered after the patient had been dismissed from the hospital. The patient threatened to bring suit against me, but I assured him that the gauze had been intentionally left in the sac, and that that piece of gauze was partly responsible for the success which attended the operation. The other gauze packs were gradually removed in sections, in the course of two weeks, and the patient made a perfect recovery and is in perfect health today.

The classics and often quoted mistakes of Ferrand, DeSault, Pellatan, Dupuytren—all surgeons-in-chief of the Hotel Dieu, of Paris—prove clearly that even the most experienced may be deceived. But this mistake of mine was the means of a life being saved after several of our best surgeons had abandoned a case of subclavian aneurism, in Chattanooga, as hopeless, as I shall report as case No. 3.

Having the case just reported in mind, I thought this subclavian could be treated in the same way, in the event that I should not be able to ligate the subclavian in the first division. I asked permission to have the case assigned to me and operated upon this patient February 25, 1919. The usual incision was made and the clavicle detached from the sternum, and the sac was easily seen to fuse into the innominate artery, but while manipulating the sac it ruptured and another rush of blood had to be dealt with, but it proved not to be so surprising as the first experience. The flow of blood was controlled by gauze packs. I was not satisfied with this procedure and feared that the opening was too close to the innominate artery and that a secondary hemorrhage was almost certain to ensue when the gauze had to be removed, so I sent the patient back to bed and five days later, after he had recovered from the shock of the first operation, I did a second operation when I removed the gauze previously inserted, and packed four square yards of gauze through the second incision made through the pectoral muscles, and further away from the origin of the subclavian. The hemorrhage was easily controlled, but an immense amount of blood was lost during this second performance as well as the first.

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*Read before the Tennessee State Medical Association.

The aneurism was of such size that there was much pressure on the cervical and brachial plexus, and there was paralysis of the entire upper extremity. For two days I almost despaired of saving the arm on account of the slowness of the collateral circulation to become established. I ligated the axillary vein in the second operation. After forty-eight hours the circulation improved very rapidly, but the innervation did not show any improvement until I began to remove the gauze in sections ten days after the second tamponade. I removed all of the gauze packs in the course of four weeks; perhaps I could have safely removed them within two weeks, but I was playing safe. There was at no time any elevation of temperature, to speak of, and the oozing stopped after the second day. It is plain that the bleeding from the orifices that opened into the sac were avoided when the orifices were sealed by plastic exudate or organized thrombi.

While obliteration of the orifices by thrombi or exudates can take place very quickly (within a few hours or days) it is evident that no dependable hemostasis can be expected until complete organization of these exudates or thrombi has taken place. The organization of a clot, or an exudate, cannot be expected to occur until at least twelve or fifteen days have elapsed after the tamponade of the sac. At the end of the second week, organization of the clot should have begun, but this can only be recognized by the presence of granulation tissue. The time for the removal of the pack may be hastened by a premature detachment of the gauze, but it is safe to wait until granulations are plainly visible in the edges of the wound, or when you can find a portion of the gauze that you can remove without any exertion. Within two weeks the gauze becomes thoroughly saturated with the exudates and it is not difficult to remove it. Be sure to save the deeper pack for the last act.

After the gauze had all been removed the sac filled rapidly with granulations. After the original pack was removed it was necessary to insert fresh gauze for several days as a drain. This patient showed a Wassermann four plus.

I contend that it was better to have treated this case in the manner above described than to have ligated the innominate artery, and I believe that the case of external iliac treated by the open method and gauze pack was preferable to a ligation of the common iliac, and both cases were of such immense size that I doubt if any other procedure would have given as good results. However, this method is only offered in cases of great emergencies, which they represent. After searching all available records I have failed to find such 'an operative procedure reported and Dr. Matas thinks that these two cases are unique experiences.

The next case is one of multiple aneurism, necessitating amputation and should be recorded as a rare example of the aneurismal-diathesis.

This patient was 32 years old, white, a machinist by trade. Wassermann reaction four plus; the entire arterial system markedly sclerosed. Was admitted to hospital August, 1916, with radial aneurism. The radial artery for four inches above the aneurism was practically solid which made it impossible to do any operation but the simple ligature just above the aneurism, and the free incision of the sac to let out the clot. The patient was given several doses of Salvarsan and made a good recovery as far as the aneurism was concerned.

In August, 1917, this patient was rushed to the hospital in a state of collapse, with a diagnosis of hemorrhage in the abdomen, as he had complained of a severe pain in the region of his liver before he became unconscious from the loss of blood. His abdomen was quickly opened and at least two quarts of clotted blood was removed, and a very perceptible oozing was seen welling up in the right lobe of the liver. The hemorrhage was controlled by two matress sutures and a gauze pack. The hemorrhage was undoubtedly from a branch of the hepatic artery and represents the third such case recorded. Patient made a good recovery and with specific treatment gained thirty pounds in four months.

In May, 1918, same patient was admitted the third time for aneurism of the tibial artery. The aneurism ruptured before he reached the hospital.

The aneurism was packed with gauze and gradually removed; no further surgical attention given at that time, but patient remained in the hospital four months, and was treated by Dr. Meacham who had referred the case to me on previous occasions.

February, 1919, fourth admission to hospital. Diagnosis of gangrene of all toes on left foot, due to endarteritis. Amputation of toes necessitated. And in March another operation was necessitated by gangrene of leg.

This patient's history, his radial aneurism, the hemorrhage in the liver, the aneurism in the anterior tibial artery, and the gangrene of his toes, and later his leg, caused by general arterial disease, makes it almost certain that the hemorrhage in the liver must have been the result of a rupture of a small aneurism of one of the branches of the hepatic artery. The fact that it occurred in the substance of the liver, and that it was controlled by parenchymatous sutures (two mattress sutures) and a gauze pack, would indicate that only a peripheral branch was involved. This is the rare and exceptional feature of the case, because, while the literature of hepatic aneurism is rich in the reports of cases in which the main artery or its branches have been involved, the aneurisms have rarely, if ever, developed in the hepatic substance where the vessel is well supported by the prolongation of Glisson's capsule.

Of course, whether the hemorrhage was the result of a rupture (probable miliary) aneurism, or of a simple breakdown of an atheromatous artery, has not been determined. While the hepatic artery, or its branches, have been ligated eleven times, there are only two cases in which this ligation was done for *aneurism* of the artery or its branches. (Kerr and Tuffier.)

Money and Service.

As a rule normal human emotions govern every human being, including the physician. Therefore, if the recompense for labor does not enable the physician to carry overhead expenses; does not give him time and funds for improvement, study, travel and necessary recreation; does not produce profit that is protection for his family and for himself in sickness and old age; he can neither give efficient service nor continue to progress. If adequately recompensed he can give scientific service far more readily and is more likely to progress.—G. S. Peterkin in the *Western Medical Times.*

IS SHE PREGNANT?

G. K. Dickinson, M.D.,
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Woman is a peculiar creature. In the sweetest language of poetry she is spoken of as coy and modest, vacillating and changeable. Her curious viewpoints and lack of logic are all-appealing. We worship woman because she is different from ourselves, so unique in her manifestations of character. No one can yet say that he knows what a woman is going to think or what she is going to do. And our great regard for her is brought about not so much because of her personal beauty, but because of her varying landscape.

Biologically speaking, we find that woman is largely activated by her thyroid and sex glands, while the manly man is largely under the influence of the hypophysis and adrenals. The two latter glands make for cold calculation and the former glands for warm sympathy and intuition. This is the normal woman. Here we have in the two sexes positive and negative electricity, attracted to each other. We have two broadly different natures which produce a satisfactory response when brought together, one supplying to the other moods and mentality which are most missed.

In the early ages we have reason to believe that these two types prevailed, but by the influences of civilization, communal life and the results of education the secondary characteristics are crossed over, and a large per cent. of people are physiological hermaphrodites: men with some female characteristics, soft in their nature, irresolute, the middle-of-the-road type; and women who show the hypophysis and adrenal ascendency in a measure, developing bone and hair, soubrette voice, and a nature which leads them to expect the recognition and position which man has always occupied; the broad line between masculinity and femininity disappearing.

In the woman of pure femininity, the events which are normal to her will be normally expressed. It is a rare thing to have her become pregnant and not demonstrate the symptoms and signs of pregnancy in the normal way, so that we can decide whether or not she be in that condition, but the woman with narrow costal angle, with visceroptosis, with an imperfectly developed heart and blood vessels, or the one with hypophyseal tendencies (where we have hair growing like a man's where the bones are large and the muscles thick and strong), it is hardly to be expected that the reaction of impregnation on the body and its nervous system will be quite according to the books.

No where in diagnostics have we the difficulties and the disasters to reputations as in the diagnosis of pregnancy. Woman's desire to have children, her longing for maternity, may so impress the nervous system as to produce a mimicry.

How well I remember in the early years of my practice being sent for to attend a woman in confinement. She had gone nine months without flow, so she said. Her abdomen was big. On the table alongside the bed were the little clothes. Putting a tape on my vest button I sat down to make ready. The pains she was having did not seem to be the same as expected in these cases, and on examining I found it was nothing but gas! I told her she was not pregnant and I was dismissed.

Then, again, the woman may pay no attention to herself, may be indifferent as to her uterine condition, flow every month, give no indication through symptoms, and yet something may start up.

Mrs. E. L. had not had a child for sixteen years. Menstruations were regular and normal in amount. Her mind had not been upon herself. But she had a prolapsus and the womb was large and giving her considerable distress. I diagnosed myoma, did a hysterectomy, only to find she was two months pregnant.

The first case often deceives the young practitioner. The second type will deceive any one. But woman is a fair deceiver. She does not stop at just this point in her endeavor to perplex the diagnostician. I have repeatedly seen something as follows:

Mrs. M. H. had pelvic distress for a year. Her menstruations were regular, the last one more than usual. No history of pregnancy. There was a tumor on the left side, with some pain. Myoma was suspected. Through the abdomen I did a hysterotomy upon a uterus the size of a three months pregnancy. Its color was uniform, it had an elastic feel, no corpora lutei were present, and a diagnosis of myoma undergoing mucoid changes was made, but through the hysterotomy wound a cystic mole was found.

Mrs. A. J. was in the habit of skipping her menses for several months at a time, then having them reappear. Had not seen any flow for three months, then it came on with severe pain in the lower abdomen. The cervix was soft, the womb enlarged, tender, apparently fixed, somewhat fluctuating and pressing into the rectum. There was no rise in temperature. The case was diagnosed salpingitis purulenti. Through a mesial incision we did a celiotomy. Adhesions covered the adnexa; the womb was soft, size of three months pregnancy, with intermittent contractions indicative of an active content. The adnexa were separated from the adhesions; the pyo-salpinx dropped into the pelvis removed. The uterus was split for diagnosis. It was foul and necrotic. On further examination, a necrotic decidua was found in the vagina which was not there before etherization was started.

Sometimes a surgeon will make a poor job of things, producing what we are calling the "junk of jitney surgery" (because an operation performed without proper reason and thoroughly completed diagnosis is jitney surgery, and because Noble has called its results junk).

We have a very pretty case of this in Mrs. M. K. She had had her cervix amputated. There was a pin-hole through which the menstrual flow would leak at times. There was pelvic pain. The uterus was very large and a diagnosis of some type of bleeding uterus, possibly myomatous or fibromatous, was made. We opened the abdomen and found the womb enlarged to the size of a three-months pregnancy, soft, both ovaries free from indication, that is, no proper corpora lutei, both tubes swollen, clubbed and surrounded by old blood clot. At intervals of about half a minute the uterus would contract, wrinkle itself, contractions beginning at the Fallopian horns and extending down over the entire fundus, generally a pretty good sign of some active tension. During contractions a small quantity of blood fluid would be squeezed out of the distal portion of the tube. Relaxation would then take place. We did a hysterotomy and found a hematometra, produced by the contraction of the scar of the amputated cervix.

Experiences with the malignancies are also entertaining. A goodly number of the profession are wedded to the curet. It is almost a crime for a surgeon to incise a malignancy in a breast or elsewhere in the body, even for diagnosis. An elaborate technic is provided for those who have the false courage to do so, so that the cancer cells will not pass through the lymphatics or be wiped up into the non-invaded tissues. But the average gynecologist feels that he must scrape the uterus for diagnosis, thereby opening venous channels and the lymphatics of the organ to possible invasion. We have seen cancers which more than once have evaded the curet. McMurtrie of Louisville and others have demonstrated that one can not properly curet the cornua. I have repeatedly curetted a womb for my students and allowed them to follow me, then removed the organ, split it, and shown how imperfectly the curet's work has been. Most of it was shredded, not removed, and the corners had not been reached. So, when suspicious of malignancy I avoid the curet and subject myself to surgical criticism by doing a hysterotomy. My conscience is satisfied—my surgical brethren critical.

Mrs. J. F. had a uterine discharge. The cervix was large and cicatrized from previous confinements, and somewhat friable. I diagnosed malignant cervix with possibly pregnancy. A hysterectomy was performed; the diagnosis of the cervical condition was held, but the cavity of the uterus was extensively malignant and putrid. In this case the discussion came up, Might she not be pregnant? How could we tell? What was best to do, with the possibilities of the woman going to term and having a Caesarian?

Mrs. J. J.—regular up until a few months ago. Menses skipped, then reappeared. She became markedly anemic, feeble, suffered great pain. Examination was negative except to find the uterus enlarged. Consultation with a specialist in obstetrics eliminated pregnancy. We did a hysterectomy through a mesial incision. The fundus was soft and very pale. On being removed, we found a placentoma.

Sometimes a woman will not be truthful, and in the thyroid woman truthfulness does not always mean intent to cover. Then there are those who will in an effort to protect themselves either make light of past incidents or hope that the surgeon will be able to eliminate the convincing evidence before she returns to her family.

Mrs. L. W., widowed, came into the hospital with a cystic mass in the lower abdomen. Her story was somewhat indicative of pregnancy, but she absolutely denied contact and possibility of conception, looking one straight in the eye. We then told her that she either had an ovarion cyst or was pregnant, and she must be truthful. She affirmed what she had said previously. We did a celiotomy and found a four-months pregnant uterus and closed. The next day on being told of the condition we left her in, she acknowledged the truth.

Miss J. C. had a large hard mass in the abdomen. Pelvic distress was complained of, some interference with defecation, but any perversion of menstrual function was denied. We did a hysterectomy for a four-pound myomatous uterus, and in between each tumor snugly placed was a two-months impregnation.

We have often found that the cycle of menstruation did not give one a truthful indication of pregnancy. The secondary phenomena of vomiting, large tender bosoms, enlargement of thyroid, perverted appetite, etc., were also not very important aids in making a diagnosis. How often have we pondered at the bedside as to what it might be. Carstens very cleverly says, "When in doubt, wait." But in some of our cases, according to the histories just mentioned, waiting might have proved fatal; in others, waiting would not have helped in the diagnosis. But in the large majority of cases the young man had better wait than make a break.

The greatest puzzles come to the surgeon who on opening the abdomen, has the womb in his hand and still is in doubt as to what procedure should be followed out. The book tells us that the corpus luteum remains over for a certain number of months after impregnation begins. In some of our women they were found distinct and strongly suggestive of impregnation. We have taken the cue and replaced the uterus. But in spite of books, they were not always found, certainly not as often as we would wish, and further study has to be made as to the position the tubes bear to the uterus and their relative size as compared with it. Usually, the Fallopian tubes become somewhat hypertrophied; they enter the womb slightly anterior and not far below the fundus, but in some cases of impregnation the contained fetus has developed the fundus more than normally and the tube enters the womb at a lower placement, which is very deceiving in differentiating between a soft myoma and a pregnancy.

The consistency of a uterus cannot be a guide. We have seen a uterus that was as soft as a hydrocephalic brain and as mottled, which had a myomatous content. We have seen others that were strongly suggestive of myoma, round red, fairly uniform which contained a fetus.

There is a sign occasionally found, which is strongly suggestive of increasing tension, such as a growing fetus will produce, and a myoma will not, and that is, intermittent contractions beginning at the Fallopian entrance, passing over the uterus, producing marked wrinkling, followed by relaxation. This interesting phenomenon is not unusual, and increasing tension will produce it, and a live fetus generally, but as in the case before mentioned, a hematrometra was seen to do the same thing.

In my experience of over forty years with women I must acknowledge making more errors in the diagnosis of pregnancy than in any other one condition. It is extremely disconcerting to tell a woman that you will be around in a few months and bring her a baby and find out at the last minute that she is not in the family way at all. It is equally disturbing to have an abdomen opened under the diagnosis of tumor and remove a uterus containing a fetus. But perhaps the greatest calamity is to diagnose pregnancy, with the womb in your hands, put it back in place, and then have the woman return in a few months and criticize your statements to her, and feel that you have to put her to sleep again and finish your job. Interns will laugh, the public will scorn, and the error will not be soon forgotten.

There is no royal road to diagnosis in these conditions, but the happiest man is he who remembers that there are types of women, that those who have not been suppressed and perverted by years of civilizing influences will give the fewest errors, and the city girls whose ancestors have been pampered by ease and civilization will be more prone to perlex. In them the cocktail influence of the several internal secretions are past comprehending. Hypothyroidism, defective secretion of corpora lutea, the social life exactions, etc., will so pervert the normal nerve centers that symptoms will change and signs be lost or altered.

Before mutilating a uterus, a careful and repeated study of a most exacting history should be made and proper counsel should be obtained. Janeway used to say, "Never believe what a patient tells you, work it out for yourself." And by the bedside his advice should not be overlooked, and perhaps, also, in the multitude of cases, we should follow the advice of Carstens, "There is no harm in waiting."

280 Montgomery St.

Feelings.

Our superlative sensitiveness to our soldiers' welfare causes us to stand aghast at the blood price of war; our sublime indifference to our neighbors' weal has caused us to stand aloof from the blood price of peace. Yet, if magnitude of economic loss be the criterion, our sentiment finds the narrow channel while the broad one is ignored.—T. Norman Dean, *Bulletin of the U. S. Bureau of Labor Statistics.*

OVARIAN SALVATION VS. OVARIAN DESTRUCTION.

A. R. Bizot, M. D.
Louisville, Kentucky.

Since the day of McDowell, various opinions have prevailed as to the surgical treatment of the ovary. When it was found that these organs could be safely and successfully removed, the onslaught was little less than terrible and many healthy ovaries were sacrificed upon the altar of surgery. Then the pendulum gravitated in the opposite direction, and through conservation many slightly diseased ovaries were left *in situ* thus leaving the patient in a rather worse state than prior to the operative procedure, the mechanical irritation tending to aggravate the already pathologic organ.

Let us now digress for a moment: Rapidly is growing the opinion that an ounce of prevention is worth more than a pound of cure, and more speedily than that is waxing the efforts of prophylaxis. Already many of our states have enacted laws whereby future generations will be delivered from all forms of contamination and degeneracy; but to our knowledge such operations have thus far been practiced only on the male sex and in penal institutions. Now, just who shall decide the all-important question as to what constitutes an unworthy subject for issue, might be likened unto the most appropriate management of a compound, comminuted, stellated fracture!

The hereditary tendency no doubt plays many disagreeable pranks in the contour of our existence, but likewise does the spirit of evolution demobilize the ravages of the ages. In substantiation of this we have but to look backward to the fifteenth century when the greatest part of the world was specifically infected, and though the burden was carried by some unto the third and fourth generations, yet the virulence of the infective organism met resistance somewhere; otherwise few at present could boast of the lack of contamination.

How proudly do we hail our ancestry especially if they left great wealth, associated with a king or ruler, or proved themselves heroes; the enormity of our nothingness compared to our cherished paternity echoes the historical repetition of degeneracy. All any family has to do is to become large enough and some members thereof will find their way to the rendezvous of misery, degeneracy and the penitentiary! Would you practice oöphorectomy on the first kin to obviate the encroachment of the latter sting? More than ever are we living in an age of faddism, and the guillotine of the broad ligament lacks for execution only popularity. The efforts of the public health system for the elimination of communicable diseases is most admirable and is to be concurred in by the profession at large so long as the efforts are confined to cure; beyond this (especially should it ever reach the climax of ovarian destruction) does it deserve universal condemnation.

Returning to the original question: It is now an established fact that the ovary has more to do than mere ovulation, that its secretory function is equally important. "It is well known that the ovaries and testicles have at least three distinct functions: (a) generation, (b) action through absorption on the central nervous system which gives to men and women their physical, moral and intellectual characteristics, (c) a special tonic action which reinforces in a special way the action of the spinal cord and brain. These cannot be disputed."

According to MacLean there are excellent reasons for believing that the ovaries are intimately concerned in internal secretion, and the evidence is almost all in favor of such a relationship. The experiments of Loewy, Richter and many others show conclusively that the ovaries form a specific substance which increases oxidation of the tissues. This agent enhances metabolism, increases the hemoglobin content of the blood, and produces an increase in respiratory exchange. Graves claims "after sexual maturity the ovary exercises a trophic influence over the other internal and external genital organs." Novak assigns to the corpus luteum the cause or control of menstruation and emphasizes that it operates in association with other ductless glands. Heimann ascribes to internal ovarian secretion the property of reducing the number of lymphocytes, showing a variation of eighteen to twenty-two per cent. in their number at menstruation and between periods. MacLean believes the evidence is too conflicting to justify a positive opinion that the ovary performs no function after the menopause. It is well known that those cases of double oöphorectomy followed by marked nervous and mental symptoms have a higher percentage of persistence of serious nervousness and mental disorders than would be found in a similar number of non-surgical climacterics.

In a study of one hundred and twelve cases Gordon presents some interesting figures for consideration. In thirty-four cases double oöphorectomy was performed for vague abdominal disturbances together with a train of indefinite nervous symptoms. Nine showed immediate improvement in pre-existing functional disorders, but shortly thereafter the former conditions returned. "In all the cases the former nervous and psychic phenomena have become aggravated in weeks and months following the operation." In seventy-five of the one hundred and twelve cases complete hystero-oöphorectomy was performed. "The removal of the diseased organs removed the localized discomfort, but in the months following the operation symptoms of a more distressing nature began to develop. In the large majority of the patients the former nervousness not only remained but became accentuated." Gordon observes in conclusion that as in the removed organs healthy portions of tissue were invariably found, it is to be supposed that the removal of the latter is in some relation to the morbid phenomena noted after the operations. The logical conclusion seems to be that one must be very cautious in advising operation on the generative organs and the tendency should be to oppose as much as possible the removal of any amount of normal tissue found in the uterus or ovaries. No operation should be advised on healthy organs if a woman complains of vague nervous symptoms. (Gordon.)

The summary presented by MacLean seems so appropriate that it is reproduced almost verbatim:

(1) That the ovary is probably vitally concerned in the scheme of internal secretion, and while such function may gradually decrease after forty-five years of age, as do the activities of many of the other organs of internal secretion, yet we have no reason for believing that such function ceases abruptly at the menopause:

(2) That the fact that nervous and mental symptoms following artificial menopause are apt to be more violent and more lasting than those following the natural menopause, is additional evidence that the ovary has been concerned in something else besides ovulation and menstruation:

(3) That irrespective of the age of the patient some ovarian tissue should always be left.

The congenital absence of both ovaries is recorded, but associated with this status is usually some prank of nature which results in other malformations. The absence of one ovary is more frequently recorded and this may occur without other deformity. Such an instance was recently reported by Dr. H. Horace Grant, of Louisville, in a woman of twenty-four who presented decided indications of right tubal disease. Exploratory celiotomy disclosed evidence of existing chronic appendicitis and also a cystic right ovary. After carefully exposing the left side, a stump of the tube about an inch and a half in length was found, the remainder evidently being congenitally absent; there simply remained this tubal stump with no vestige of the ovary. The patient was the mother of one child, and had menstruated normally since she was fourteen. She had not previously been subjected to any surgical operation. About two-thirds of the right ovary was resected and the appendicitis was also removed. The patient made an uneventful recovery.

Investigation of the literature shows that congenital absence of one or both ovaries constitutes an anomaly not infrequently observed. While this peculiarity is oftentimes associated with other generative developmental errors, many exceptions will be found to any rule which might reasonably be formulated; thus a woman may possess ovaries without Fallopian tubes, uterus or vagina; likewise she may have one or all the latter without the former. Hunter, Vidal, Chaussier and many others record typical instances of total congenital absence of the ovaries, and Thudicum at one time collected twenty-one cases of this character. Observations are also published by Morgagni, Pears and Cripps showing that they had noted absence of the ovaries. Cripps speaks of a girl of eighteen who had no ovaries; she neither menstruated nor exhibited any of the signs of puberty. Lauth saw a woman whose ovaries were rudimentary and who showed none of the physiologic characteristics of her sex. In contradistinction to the foregoing peculiarity, Ruband describes a woman with rudimentary ovaries who was "very passionate and quite feminine in her aspect." Ferguson, Spruill, Stewart, Garcin, Todd, Frank, McCann, Ramage, Ladinski, Wright, Withrow, Tuttle, Faidherbe, Dorland, and a host of others, cite instances in which the ovaries were congenitally absent. The aforementioned anomalies seem to create no physical unrest; being congenital no doubt they are cared for from the beginning.

Attention must now be directed to the surgical ovary, and no doubt every operator has been confronted with the problem of "to be or not to be." A survey of the literature leaves the unbiassed reader in much the same attitude, so far as a conclusion is concerned, as in the etiology of the recent pandemic of influenza. It is held that the thick, smooth, "leathery-skinned" ovary, such as is found associated with retroverted uterus, where the organ lies deep in the cul-de-sac and is subjected to the trauma incident to that situation, should be subjected to resection on account of the inability of the Graffian follicle to force its way to the surface thereby causing a fruitless and painful menstruation. The converse is also held, i. e., that it is far better to partially decapsulate or incise and suture such an ovary and at the same time suspend the uterus, thus the power of resistance offered the follicle is obviated and ovulation continues unimpaired. In rebuttal, however, it is contended that cicatrices from incision offer even a greater resistance, and thus the latter is worse than the primary evil.

It is the small cystic ovary which calls for a more accurate judgment. It is the type most frequently encountered and the end-results are more closely observed. Gradations from radical extirpation to mere puncture have been the subject of unending discussion. As early as 1864 Sir Spencer Wells emptied some dropsical follicles in one ovary of a young girl after having removed its fellow. The girl afterward married and had children.

Whitacre reports the case of a woman aged thirty-five with ovaries twice normal in size filled with Graffian cysts. He performed almost complete section of both ovaries with Montgomery-Gilliam suspension. The woman gave birth to a child one year later. Johnson removed a right ovarian cyst and eight-tenths of the left ovary. Two years later the woman bore a child. A case came under the observation of the writer about two years ago where the right ovary and half of the left were removed for cystic disease. The patient was twenty-four years of age. Fourteen months after the operation she gave birth to a normal child.

It is not my purpose to consider the Fallopian tubes excepting in so far as they are intimately associated with the subject. In 1911 I administered the anesthetic and with interest observed the operative procedure for removal of all of one ovary, both Fallopian tubes, and the greater portion of the remaining ovary. In about sixteen months the patient bore a child and has had subsequent children. I am informed that a distinguished surgeon of Baltimore removed both tubes and amputated the cornua of the uterus, one ovary in toto, the other in part, with subsequent normal delivery of an average-sized healthy child.

Burroughs refers to a woman upon whom successful bilateral salpingo-oöphorectomy had been performed. Two and a half years later she gave birth to a male child weighing eight and a half pounds.

Schatz removed a large cystic tumor of the left ovary, including the outer third of the tube and all the ovarian tissue that could be found. The right ovary was resected and three silk ligatures passed between it and the broad ligament. A piece of ovarian tissue two mm. broad was left on the proximal side of the ligature; the right tube was allowed to remain intact. The patient was safely delivered of a child five years later.

Martin many years ago recommended the partial removal of ovaries not entirely diseased. He also resected part of the tube and made a new ostium by suture of mucosa to serosa. His experience suggests that patients recover perfectly after partial removal of ovaries for localized chronic inflammatory changes, hydrops folliculi, and oöphoritis. Recovery is also complete in most cases after resection of obstructed and otherwise diseased tubes. The after-histories of patients operated upon prove that women with resected ovaries and tubes are not more exposed than other women to further disease of the portions left behind.

Morris reports the case of a woman who was subjected to double oöphorectomy. Soon after the operation the patient began to menstruate, which function continued regularly and painlessly for four months. Fourteen months after the operation she was delivered after a normal labor of a healthy girl baby. The child died when about three weeks old, and soon thereafter the patient began to menstruate and continued to do so regularly and normally.

Robertson performed double oöphorectomy for cystic ovarian disease in a twenty-three year old woman. Three months afterward she menstruated. Five months later she married and became pregnant. She was delivered of a healthy boy baby at term.

Sippel reports double oöphorectomy in a woman thirty years of age. The right ovary was converted into a tumor the size of a child's head and without a trace of normal ovarian tissue. This was removed with its tube. The left ovary was the size of a goose egg. Along the hilum was a tract of normal tissue. A clamp was applied above this tract to arrest hemorrhage and the diseased portion of the ovary resected. The raw surfaces were united with catgut sutures, some of the blood vessels were ligated separately. This healthy portion was one inch and a half long by a third of an inch thick; the left tube was undisturbed. Menstruation returned after the operation, pregnancy supervened and the patient was safely delivered of a living child.

Sherwood-Dunn cites the case of a woman of thirty-five operated upon for bilateral salpingo-oöphoritis. The left ovary was found to be friable and presented numerous sanguineous cysts; the Fallopian tube was thickened, its extremity livid and extrophiated but permeable. It was removed with the ovary. The right ovary presented a tumor the size of two peas at its external border; the remainder of the ovary appeared healthy; the Fallopian tube was thickened and congested. A stylet passed through its lumen proved it to be unobstructed and it was decided to excise the small ovarian tumor by resecting about one-quarter of the body of the ovary. The wound borders were brought together and sutured with fine catgut. About a year later the patient gave birth to a well-formed seven-pound female child.

Gordon cites two instances where pregnancy followed the removal of both ovaries and tubes. In neither was it known that any ovarian tissue had been left yet he supposed there must have been. Probably a stump of tube had been left and the ligature disappeared.

Smith removed the tubes and ovaries from a woman who gave birth to a child two hundred and sixty-seven days after the operation. She had probably been impregnated just before the operation.

Sutton gives the history of a woman upon whom he had performed double oöhorectomy, removing from one side a multlocular cyst weighing twenty-five pounds, from the other a similar cyst weighing six pounds. On the first side he seared the pedicle with Paquelin cautery. This "failed to work" on the other side and he ligated the tube close to the uterine cornu. The uterus being in retroversion he attached its fundus to the anterior abdominal wall. Two years later the patient gave birth to a male child weighing ten and a half pounds, and subsequently bore another child weighing eight pounds.

Englemann refers to a case in which pregnancy followed double oöphorectomy, the right Fallopian tube being left intact. Some ovarian tissue was probably left at the operation.

Kossmann mentions a woman from whom he removed both ovaries, leaving the tubes, concluding the operation with vaginal fixation. The patient bore a child two years afterward. He supposes a fragment of ovarian tissue must have adhered to the ligature. This case also shows that proper vaginal fixation exercises no destructive influence upon either pregnancy or delivery and outlives both in its effects.

Ill performed double oöphorectomy upon a woman of twenty-eight, for bilateral cystic disease. A small amount of ovarian tissue was left on the right side. Five years later the patient was delivered of a living child at term. The author remarks that "the Fallopian tube may slip from the constricting ligature and thus remain patulous."

Doran mentions a woman aged twenty-five who, after bearing one child, underwent oöphorectomy for multilocular adenomatous cystic tumor of the left ovary. She later bore four additional children. When thirty-nine years of age she came under the author's care and he removed a similar tumor of the right ovary. The woman became pregnant and gave birth to another child two years after the last operation. Menstruation again appeared and continued until advent of the menopause.

Baldwin records the case of a woman aged twenty-four who had given birth to two living children and was pregnant about three months. She presented two ovarian cysts, each the size of a cocoanut, which had become slightly adherent, but were distinct, and each had a long pedicle which was exceedingly small. The pedicles were ligated and the tumors removed. Recovery was prompt and the woman was delivered of a child at term. The author states that subsequently two additional children were born to this patient. Although it was supposed both ovaries were completely extirpated, the possibility is admitted that a small amount of ovarian tissue may have been left on one side or the other.

Baldwin also mentions the case of a woman aged thirty-two, the mother of one child aged nine, who had suffered from menorrhagia, leucorrhea, etc., for six years following abortion at two months. Local treatment, including curettage, had been unsuccessful, and it was decided more radical intervention was necessary. Accordingly both ovaries and tubes were extirpated. The ovaries were not adherent and every precaution was observed to effect complete removal. The symptoms continued and later curettage was again practiced without benefit. Physical examination eighteen months after double oöphorectomy revealed a small tender mass to the left of the uterus. The abdomen was reopened and the mass of tissue referred to, which was between the layers of the broad ligament, was easily identified and removed. It was about the size and conformation of a lima bean and presented all the characteristics of ovarian tissue. "The persistence of menstruation in this case, after double oöphorectomy, indicated the existence of ovarian tissue outside and independent of the ovaries, and the second operation positively demonstrated the presence of such anomalous tissue."

Meredith reports the case of a woman aged thirty-five two or three months pregnant upon whom he operated and removed bilateral ovarian (dermoid) cystomata. Three days after operation uterine hemorrhage developed and persisted forty-eight hours culminating in the extrusion of a vesicular mole. Menstruation recurred regularly thereafter for eighteen months, then ceased. A premature fetus was expelled following an accident. Menstruation was regular after convalescence. The author believes re-establishment of menstruation and the advent of pregnancy in this instance may be explained on the theory that some portion of ovarian tissue capable of maturing follicles was left untouched at time of operation, and that the patency of one or both Fallopian tubes was subsequently restored. His belief is that the ovarian tissue "consisted of an outlying portion in connection with the uterine extremity of one of the ovarian ligaments." The probability of there being a third ovary with its accompanying oviduct was considered unlikely.

The existence of supernumerary ovaries was at one time vigorously disputed. However, since the painstaking researches of Biegel, Puech, Thudicum, Winckel, De Sinety, Pauadino, and others, the occasional presence of a third ovary appears to be an incontestible fact. The original hypothesis was that supposed supernumerary ovaries were simply segmentations of the normal organs and connected therewith; but more recent reports warrant the admission that these anomalous structures are separate and distinct organs.

Sippel records an instance of a third ovary, Mangiagalli found a supernumerary ovary in the body of a still-born child situated to the inner side of the normal organ, Winckel discovered a large supernumerary ovary connected to the uterus by its own ovarian ligament, Klebs found two ovaries on one side, both consisting of true ovarian tissues, connected by a band three-fifths of an inch long. Seitz collected six instances of supernumerary ovaries associated with extra Fallopian tubes.

Manton records a case in which he removed the left ovary and tube and resected a cystic right ovary. A few months later he found it necessary to extirpate the resected right ovary which had undergone cystic degeneration. Behind the uterus buried in the tissues of the cervico-vaginal junction and distinctly below the peritoneum was a third ovary more than an inch long and three-fourths of an inch in thickness. The pathological report showed that the stroma of the specimen was ovarian. There were a few Graffian follicles which had degenerated in their contents. The specimen had two varieties of cysts, one, the ordinary diltation of the Graffian follicles, the other having very irregular walls with acute inflammatory changes in the lining membrane. The stroma did not appear to be affected by this. There were numerous areas of hyaline degeneration, and some of this change had also taken place in the walls of the blood vessels.

During an operation for bilateral cystic ovarian disease Noble discovered a well developed third ovary about the size of a wren's egg situated an inch posterior to the left ovary. It was located in the broad ligament "posterior and inward from the left ovary." Microscopic examination proved it to consist of normal ovarian tissue.

According to Doran supernumerary ovaries may be divided into three classes:

(1) The ovarium succenturiatum of Beigel.

(2) Those cases in which two masses of ovarian tissue are separated by ligamentous bands.

(3) Entirely separate organs as in Winckel's case.

Beigel claims that supernumerary ovaries have been found twenty-three times in five hundred bodies examined post-mortem. In Winckel's case there were three separate ovaries and three avarian ligaments.

Peterson has investigated two hundred and fifty cases of hysterectomy performed during six and one-half years. He finds that ten per cent. of women regularly menstruating at the time of operation will be free from the troublesome symptoms of the artificial menopause after hysterectomy with removal of the ovaries; the percentage of cases with no symptoms after similar operations will be slightly more than doubled if some ovarian tissue be retained; the severity of the symptoms of the artificial menopause is much less when the ovaries are retained after hysterectomy. It is not necessarily true that the younger the woman the more will she suffer from the symptoms of the menopause after hysterectomy with removal of the ovaries, the greatest percentage of suffering occurs in women operated upon between the ages of forty and forty-four; therefore, it is not a good rule that ovaries should be removed from patients over forty when hysterectomy is performed. The severity of the symptoms of the menopause is practically the same after hysterectomy with removal of the ovaries for fibroid disease of the uterus and inflammatory disease of the appendages. Retention of ovarion tissue after hysterectomy cuts short the period after which patients usually suffer from the symptoms of the artificial menopause. The greater the amount of ovarian tissue conserved, the more will the symptoms of the artificial menopause be mitigated.

From a study of seventy-two re-operations on patients in whom one or both ovaries were conserved, MacLean draws the following conclusions:

(1) Routine conservation without due consideration of the ovarian and contiguous pathology as it exists in the individual case, is not good teaching:

(2) Regeneration of the conserved ovary depends largely upon the type and duration of the existing infection and the condition of the tunica of the individual ovary:

(3) Even when the most detailed technic is observed, the ovarian circulation is impaired:

(4) The retained ovary without the uterus is always a focus for possible trouble:

(5) The life history of the retained ovary is of short duration, and the trophic influence of the diseased ovary has been overestimated:

(6) Finally, a cured patient has few nervous symptoms.

Under the heading of unilateral sterility, and perhaps a theory for ectopic gestation, is reported the removal of the left Fallopian tube and the right ovary, ectopic pregnancy following.—The theory of distance between the ovary and fimbriæ plus impregnation, protoplasmic cell change, a developing ovum larger than the caliber of the tube, causing engorgement and occlusion preventing its descent.

Of one hundred and thirty-two cases of hysterectomy reported by Polak, in which one or both ovaries were left in situ, seventy-three patients returned for subsequent operation. In his resume he mentions five classifications covering the return of his seventy-three patients:

(1) Technic and general health have much to do with the end results; by technic he has reference to rough handling; by general health anemia and intercurrent blood conditions:

(2) A conserved unhealthy ovary is worse than none, for the pathological stage progresses:

(3) If at the age of the menopause or beyond, removal of both ovaries gives the best results:

(4) Nervous phenomena are greater if the patient is in good health with a pre-operative high blood pressure than if the blood picture shows anemia or toxemia:

(5) The nervous state is less after inflammatory pelvic disease than fibromyomata.

In two personally observed cases of cystic ovarian disease, in each case both ovaries were removed,—one patient was operated upon more than eleven years ago,—and both have the same pelvic pains they had prior to the operative procedure. Graves suggests that conservation must have due respect for the surrounding pathology.

Conclusions

(1) If the patient has but one ovary and is without issue, endeavor to conserve it until the possibility of issue is gone; if necessary it may be removed at a later date; the same statement applies to all cases in which doubt exists, excepting in the presence of undoubted malignancy:

(2) It is a hazardous risk to leave an ovary on one side and a tube on the other:

(3) It is not always safe to remove both tubes, leave a part of one ovary, and say to the patient, "you shall be barren:"

(4) Under no circumstances remove ovaries for mere prophylaxis.

Keep Well.

A natural death is rare, very rare; as rare indeed as an honest politician. Most men commit suicide. Most men dig their graves with their teeth. That we are only fifty per cent efficient is proven. The causes are plain. Will we remove them? We will not remove them unless we cease ignoring the science of hygiene. That science only can bring us health. It is lack of it that puts us to the bad. In ill health we find the cause of our social ills. Insanity, crime, pauperism, feeblemindedness, epilepsy, delinquency and dependency are synonyms for ill health, sickness and disease. Only impracticable people ignore hygiene. Hospitals, insane asylums, jails and poor houses are monuments to our ignorance and conceit.

We must know, we must understand, and we must practically apply our knowledge of hygiene, otherwise we perish.

What is hygiene? It is the science of right living. Where must it be applied? Here and everywhere. Who shall apply it? You, I, every one. When shall it be applied? Now, all the time. Who will heed and apply it? The wise. Who will not heed and apply it? The foolish.

Robert Louis Stevenson, dying of consumption, wrote this as his last message: "I am set up at the crossroads to warn you to flee from the hebetude to come; and I say unto you, keep well; and I say unto you again and again, keep well."—*Bulletin of Indiana State Board of Health.*

INTUBATION vs. TRACHEOTOMY IN DIPTHERIA.

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Before the days of O'Dwyer, who invented and first used the laryngeal tubes which still bear his name, tracheotomy was resorted to in all cases of laryngeal stenosis complicating diphtheria. This operation, though still frequently done, has to a degree fallen into disuse, because the procedure of intubation is elected in preference, due to the fact that it is safer and more surely tides the patient over the suffocative period of the disease.

The disadvantages of tracheotomy are, among others, an open wound which may become infected or slough; the operation produces shock in many cases; an anesthetic is usually required; the air through the tracheotomy tube does not have the humidifying and warming effect of normal breathing and predisposes to pneumonia. Tracheotomy is indicated low down in the larynx where the operator, for some reason, is unable to insert the tube.

The operation of tracheotomy may be performed above the level of the isthmus of the thyroid gland (high tracheotomy) or below that point (low tracheotomy). The high operation is the one most often performed because of the accessibility of the trachea at this point and because it is more free from danger. In the low operation there is more troublesome hemorrhage and, even when the utmost care is exercised, blood sometimes seeps into the trachea during the operation, forming a clot at the bifucration of the bronchi causing death from suffocation.

The high operation is performed in the following manner: The patient is placed upon a table, his shoulders elevated and his head thrown back. This brings into prominence the thyroid and cricroid cartillages—important land marks. The broad superior edge of the thyroid should be located with the index finger. Immediately below it is the cricoid. The incision begins midway between the cricoid and the superior border of the thyroid and is carried an inch below the cricoid. The skin is retracted and the superficial and deep fascia are now divided and with the muscular tissue, pushed aside with a grooved director. Without immediate necessity for a rapid operation existing, the bleeding points should be caught and the wound left dry before the trachea is opened. The trachea, while being incised is held by a tenaculum, while the bistoury, inserted immediately above the thyroid isthmus, which usually lies over the fourth trachael ring, divides the first three or four rings of the trachae. If the isthmus is situated high up, it may be pushed down with the finger. As soon as the trachea is opened the patient coughs violently, very often expelling large pieces of membrane. When the oozing stops the canula may be inserted and held in place by pieces of tape tied about the neck, or by strips of adhesive plaster. The inside tube may be removed as often as necessary to be cleared of debris and mucus.

The low operation requires practically the same technic except more care should be exercised so as not to wound blood vessels which pass over the field of operation, and which, if cut, may cause a very annoying hemorrhage as the field must be dry before the trachea is opened.

The operation may be done under general or local anesthesia, or with no anesthetic when instantaneous relief is demanded to save life from suffocation. Chloroform rather than ether is preferred by most surgeons because it is free from spasm producing effect upon the larngeal muscles which ether is said to possess. The writer has performed two tracheotomies upon small children under weak solutions of cocaine, little pain being evidenced by the patients.

After the operation the patient should be kept under constant surveillance to prevent the plugging of the tube from shreds of membrance. Secondary hemorrhage forming a clot in the trachea, though not a frequent complication, has been the cause of several deaths, and its possibility should not be disregarded. Young children are very apt to pull the tube out, if not carefully watched. This accident occurred in a case that came under my observation a few years ago and resulted in suffocation and death of the patient.

In 1858 Bouchet of Paris passed tubes into the larynx of the living subject, but nothing of value came of his experiments until several years later when O'Dwyer, a physician in charge of the New York Foundling Asylum, inspired by the experiments of Bouchet, invented and successfully used in many cases of diphtheria with suffocative symptoms the instruments for intubation which bear his name.

O'Dwyer's set of instruments, which have not been materially modified since first given to the world, consist of a mouth gag, a thimble for the surgeons' finger, an introducer, an extractor and a set of tubes graduated in size. These tubes are made with a bulging top, which, when in place, rest upon the false cord. A scale comes with the set indicating by number the size of the tube appropriate to the age of the patient. At the top of each tube is an eyelet into which a string is tied before the tube is introduced. This is to prevent its being lost in the larynx or oesophagus should a false passage be made.

The introducer is curved and is fitted at its distal end with an obturator over which the tube is slipped. A small lever in the handle of the instrument when pressed liberates the tube from the oburator leaving it in place in the larynx. The extractor is so fashioned that it can be slipped into the tube and by a lever attachment its blades can be separated, thereby holding the tube in its grasp while it is being liberated from the larynx.

When the operation is to be done the child is wrapped in a sheet which holds the arms firmly. It is best held in the lap of an assistant while a second assistant from behind holds the head firmly in a vertical position. The mouth gag is inserted and held by the assistant from behind. A tube suitable to the child's age is selected and attached to the introducer and the operator is now ready to proceed.

During the process the surgeon should be on the alert to avoid being infected by the patient who may cough violently during the operation. It is always best to have the eyes protected with glasses and to wear moist gauze tied over the mouth.

The operation, if successfully done, takes but a few seconds. The surgeon standing directly in front of the patient passes the index finger of his left hand over the base of the tongue and feels for the epiglottis. When it is felt it should be drawn forward against the base of the tongue and held there while the tube, previously oiled, carried by the introducer with its handle against the chest, is made to slip along the side of inserted finger. As soon as it is felt at the point of the finger which is holding the epiglottis in place, the handle is elevated thereby directing the tube toward the larynx. If this is not done a false passage will be made. After the tube has entered the larynx the introducer is removed. Should the tube be expelled during an attack of coughing, the operation will have to be repeated. The tube should be left in place until evidence of stenosis ceases. After the administration of antitoxin 34 or 48 hours will suffice in the majority of cases.

When the tube is to be removed, the patient is prepared in the same way as for its introduction.

The epiglottis is pulled forward with the index finger of the left hand and the extricator is guided with the same finger into the larynx. The blades are separated and the tube is withdrawn. Should dyspnoea follow its removal, it should be reinserted.

Some difficulty may be experienced in feeding intubated children. This should not be attempted while the child is in a sitting posture, as the food will enter the larynx. The diet, if liquid, should be administered from a bottle, while the patient lies upon its back, with the buttocks and feet elevated. Solids, which do not enter the trachea while lying on the back may be fed to the older patients.

518 State Bank Building.

Who Knows.

Why do we breed morons? Is it because we wish to have social ills and then organize and support societies for amelioration and reform? Who knows?

Why do we breed idiots? Surely it is not because we want to increase taxes to build asylums and support them? Who knows?

Why do we breed mosquitoes? Can it be because we like to have malaria? Who knows?

Why do we breed flies? Is it because we like to have typhoid fever? Who knows?

Why do we grow tobacco? Is it because we want to rob the soil of potash and thus cut down wheat production? Or is it because we want the dope which tobacco carries? Who knows?

Why do we have syphilis? Is it because we desire to be covered with sores, to have paresis, paranoia and locomotor ataxia? Who knows?

Why do we have consumption? Is it because we wish to breathe foul air? And otherwise live against hygiene and health? Who knows?

Why do we breed degenerates? Is it because we wish to build more institutions and to relieve the miseries they bring? Who knows?

Why do we build and maintain hospitals? "To care for the sick, of course." Oh, yes, but why be sick? Is it because we haven't enough practical sense to keep well? Who knows?

Why do Americans spend five hundred million dollars annually for medicines? Is it because they like to make themselves sick, or is it because they like the taste? Who knows?

Is civilization an organization which aims to secure the survival of the unfit? Who knows? —*Bulletin of Indiana State Board of Health.*

THE BRITISH NAVAL HOSPITAL SHIP "GARTH CASTLE."

C. P. G. Wakeley, M.R.C.S., Eng., L. R. C. P., Lond., Temporary Surgeon, Royal Navy.

At the outbreak of war the peace time standard of the Naval Medical personnel of officers and men had to be supplemented by others and, as regards the officers, surgeons, men from consulting, town and country practices and new men fresh from the colleges were speedily available, and so, in a comparatively short time, the Medical Branch was in no way behind any other in the service.

The commencement of the war was marked by an accident which only too clearly emphasized the risks run by hospital ships, the hospital ship "Rohilla" being lost in a storm off the Yorkshire coast near Whitby, losing two-thirds of her sick berth ratings, the majority of whom were recruited from the ranks of St. John's Ambulance Association.

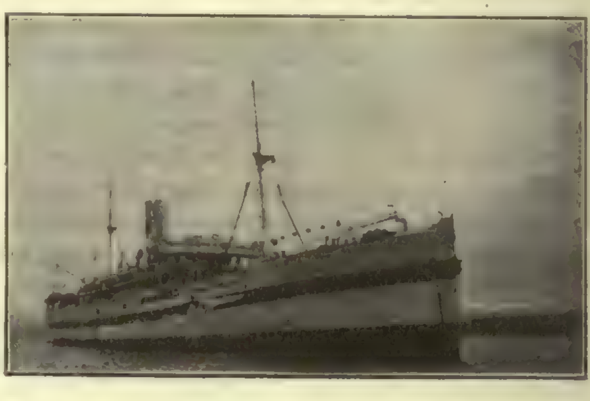

Fig. 1—H. M. Hospital Ship "Garth Castle" at Scapa Flow.

To replace this loss the Union-Castle liner "Garth Castle" was converted and staffed. It is possible that lessons taught by past experience were responsible for the splendid equipment of this ship. The "Garth Castle" in peace time was an intermediate liner running between England and South Africa. She is a ship of 14,650 tons displacement on a draught of 27.3 feet, with a speed of 13 knots. The crew consisted of 9 Medical Officers, a Chaplain, 4 Nursing Sisters, 64 Naval and 125 Mercantile ratings.

To comply with the Hague and Geneva Conventions the ship was painted white with a green band half way between the deck rail and waterline, displayed a row of green electric lights and four illuminated red crosses (two port side and two starboard side, fore and aft). At night time these lights gave the ship a beautiful appearance and markedly showed on what mission she was engaged.

At the time the Germans were committing the dastardly crime of sinking hospital ships, the funnel, which up to that time had been of a "buff" color, was painted white with a large red cross on the port and starboard sides.

There was plenty of deck space in the ship and this allowed of patients "laying out" during the fine weather in their cots.

it was also used on admittance of cot cases which were taken out of the cradle on the promenade deck, placed on the lift and lowered to whatever ward they were for.

On the upper deck there were an emergency operating theatre, used as a dental theatre, disinfector, laundry, three officers' wards and a large medical ward (F).

The main deck consisted of five wards—"A," "B," "C," "D" and "E," with the dispensary forward in "A" Ward.

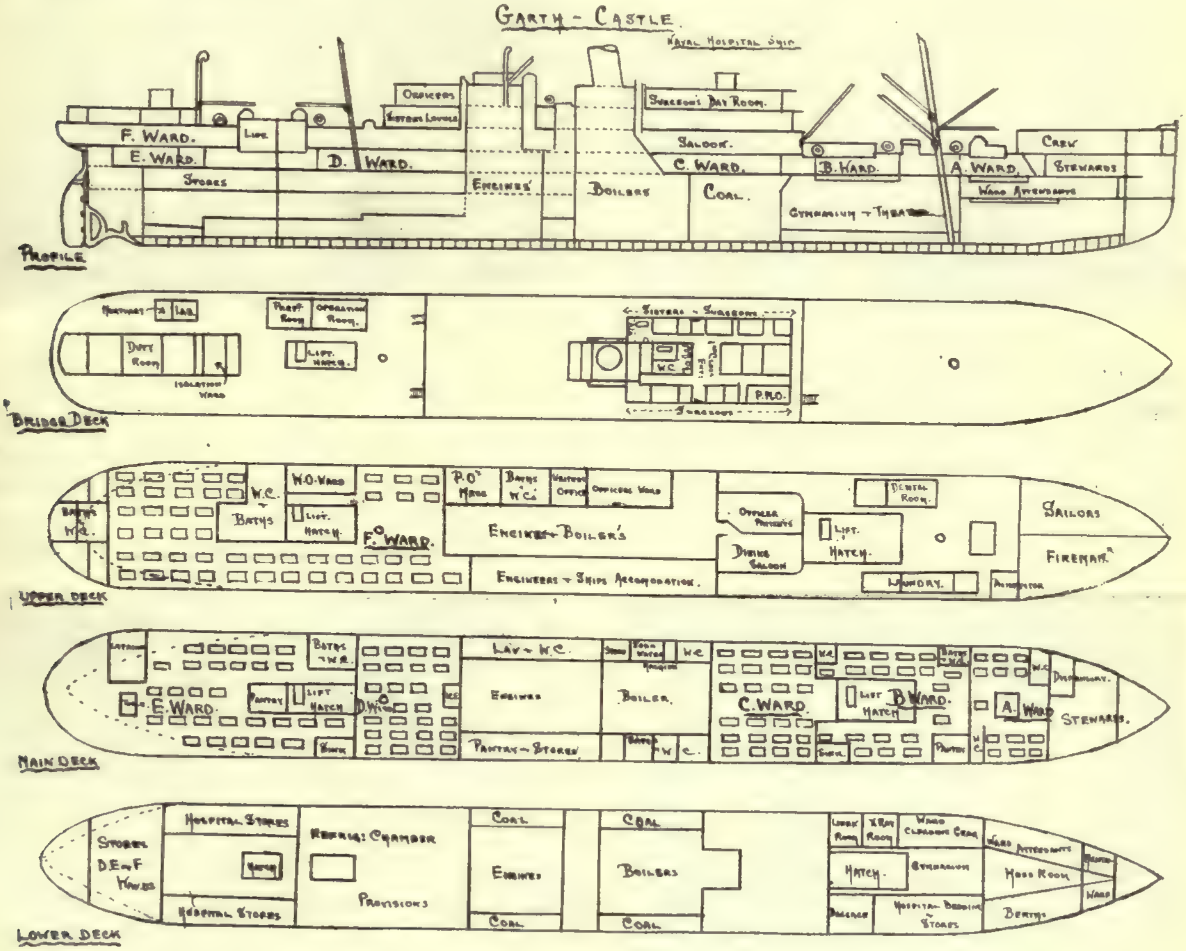

Fig. 2—Plan of the "Garth Castle."

While attached to the Grand Fleet it was customary to have the Royal Marine Band from one of the squadrons on board to play on deck to the patients. If the weather was unfavorable they played in one of the wards.

On the promenade deck aft the main operating theatre, laboratory and mortuary were situated. The entrance to the operating theatre was housed in, the lift to the wards being just outside the door. This was a very convenient arrangement, as, besides being adaptable for use for operation cases

Each ward was connected by watertight doors on the port and starboard sides. These were always closed at sea and opened while at an anchorage or in harbor.

The two after wards, "D" and "E," were the main surgical wards. "C" ward, amidships, was a minor surgical ward. "B" ward was a genito-urinary ward and contained a small theatre specially built for administering the intravenous injections of arsenical compounds in the treatment of syphilis.

"A" ward was for venereal cases and had an irrigation room fully equipped for the treatment of gonorrhea.

On the lower deck forward were the two mental wards, Naval Ratings mess deck, a fully equipped gymnasium and billiard room, x-ray room, carpenter's shop and various storerooms. It was in this spacious compartment that concerts, dances, etc., were held by the staff.

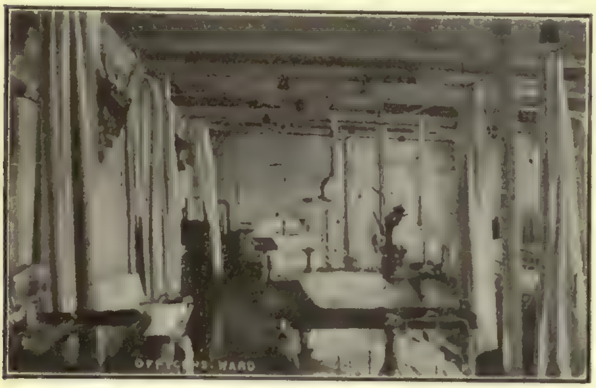

Fig. 3—Officers' Ward.

Just outside the *x*-ray room door a lift, running through "B" ward to the main deck, was fitted. This was used for patients requiring x-ray treatment and also for discharging cot cases from the forward end of the ship during an evacuation.

The after end of the lower deck, immediately under "E" ward, consisted of various storerooms and was used for church services.

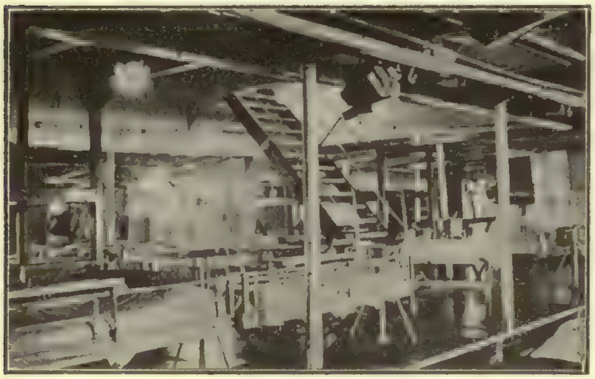

Fig. 4—B Ward—Genito-Urinary Ward.

The main operating theatre, aft, was well equipped. It was divided by a partition with a sliding door into two compartments, one being used for the preparation of cases and the other for operations.

The floor was laid with white porcelain tiles and the woodwork white enamelled.

The lighting, both natural and artificial, was excellent. The artificial lighting was by electricity. This was done on two separate circuits so that if a main fuse broke down the secondary circuit could be used.

Although the theatre was not a large one, being 24x14x8′, over 9,000 operations under general anesthesia had been carried out until January, 1919, with only one death on the table; this was a very late appendicitis case with general peritonitis.

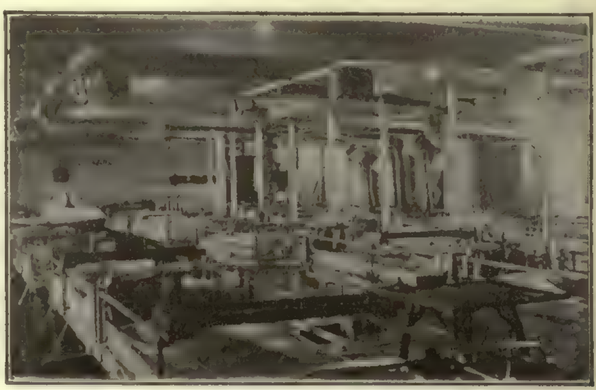

Fig. 5—C Ward—Minor Surgical Ward.

The wards contained from 14 to 58 swing-cots according to their size, the total number in the ship being 210 but with extra cots on the deck and hammocks the accommodation could have been raised to over 600.

I do not favor superimposed cots for hospital ships, because I consider the patients require all fresh air that can be obtained. In hospital transports, carriers, etc., two or three tiers of cots is the general rule, but not in the naval hospital ships.

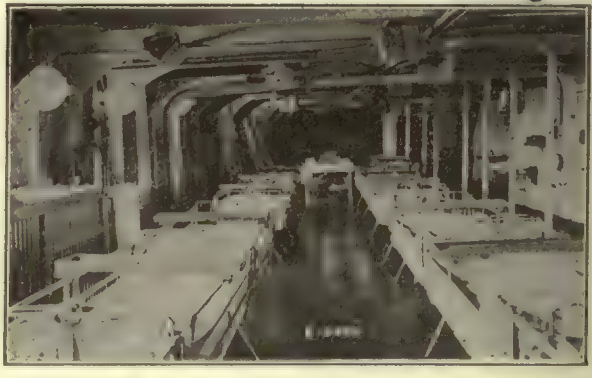

Fig. 6—Acute Surgical Ward.

Over each cot was fixed a cork lifebelt. (See photographs.)

Hot and cold water was laid on to all wards and each had two bathrooms and four or more W.C's. Patients could have hot or cold salt and fresh water baths.

Electric sterilizers were fitted to all wards.

The wards were enamelled green, the decks being laid with dark green linoleum. This was not only restful to the patients but could be kept surgically clean.

A pantry was attached to each ward where food was cooked and served to the patients.

The dental theatre does not require description. Suffice it to say that it was well equipped and under the supervision of a dental surgeon.

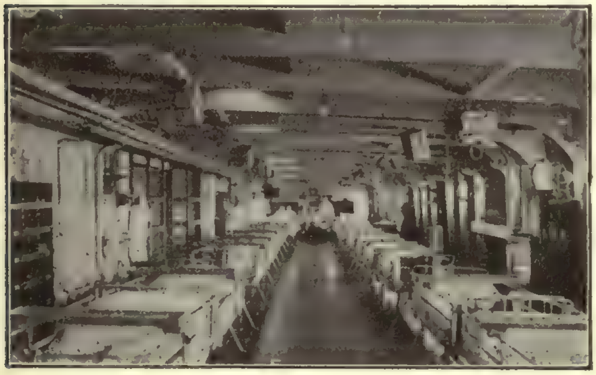

Fig. 7—F Ward—Medical Ward.

On the boat deck, forward, the Medical Officers' lounge was situated. This contained a billiard table, piano, etc., and was quite a nice room.

Opposite the lounge was the first-class smoke room which was allotted to convalescent officer patients.

On the promenade deck amidships were the Medical Officers' and Sisters' cabins, Sisters' duty cabin and the Petty Officers' smoke room.

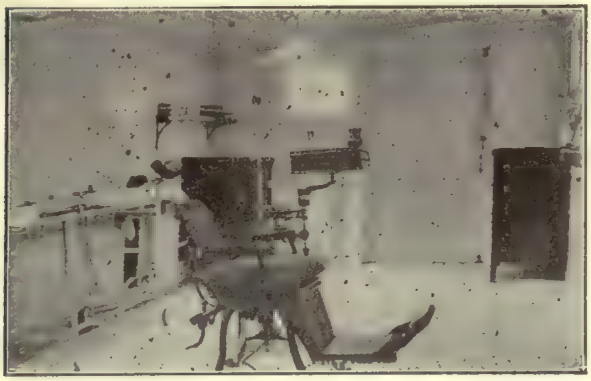

Fig. 8—Dental Surgery.

When the British Grand Fleet took control of the North Sea by closing all approaches to that part of Europe occupied by Germany its bases were three in number, viz: Scapa Flow (extreme north), Firth of Forth (south), and Cromarty Firth (intermediate). It was because of this fact that these hospital ships became something more than mere floating hospitals.

After refitting, a hospital ship would for some time remain at Queensberry in the Firth of Forth and then move to Cromarty or Scapa. If to Cromarty she would remain their for a short while and then proceed to Scapa.

At Scapa the population of a floating township composed of super-dreadnoughts to Submarines, oilers, colliers and other necessary ships such as repair and store ships, etc., would not be less than from five to six hundred thousand, and a modest computation would soon show that with a sickness rate of 1%, at least 500 cases would be occurring.

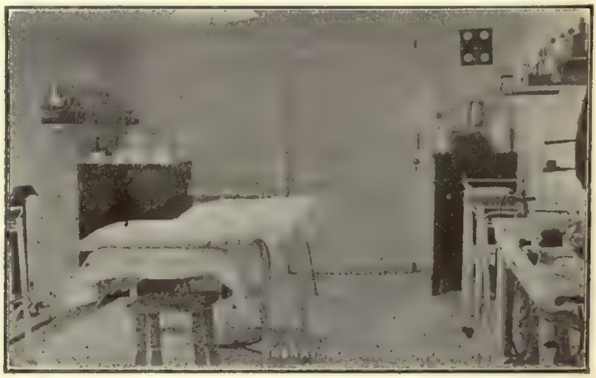

Fig. 9—After Operating Theatre.

The sickness rate in the Grand Fleet under most trying conditions was very much lower than that of modern towns. How valuable the services of the Hospital Ships were cannot yet be accurately gauged.

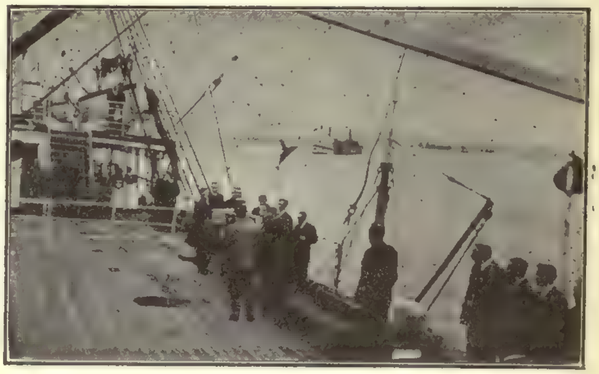

Fig. 10—Body of First U. S. Sailor Who Died on Board Going Over the Side Into a Drifter—H. S. Agadir in Distance.

The Battle of Jutland and the Dogger Bank Action showed that the proximity of shore hospitals was after all to be more desired than a whole fleet of Hospital Ships, as the warships, swift in comparison, when they could take aboard the wounded from their less fortunate comrades could land them quicker and it is a matter of speculation whether on the whole this is not more advantageous than their being taken on board a Hospital Ship. Even if a Hospital Ship could go alongside the disabled warship perhaps the risks involved would not compare favourably with the object achieved. An outstanding case, however, serves to show some degree for comparison. When H. M. S. "ALCANTARA" was sunk by the German Raider "GRIFF" in the North Sea the survivors, suffering from shell wounds and burns, were treated within 6 hours of receiving their injuries on board the "GARTH CASTLE" and the results were excellent.

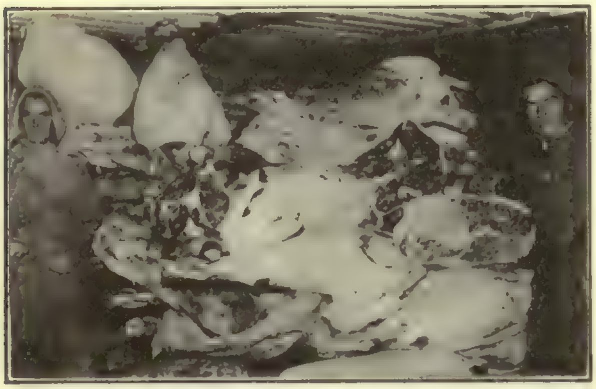

Fig. 11—Cold Storage.

During the Armistice, the "GARTH CASTLE" was employed in carrying British wounded repatriated prisoners of war home from Germany, Holland and France.

Fig. 12—Band of Ill-Fated H. M. S. Vanguard Playing to Patients on Deck, May, 1917.

On two occasions in the homeward voyage from Rotterdam to Southampton, Italian repatriated prisoners of war were landed at Le Havre, while in one of the outward voyages 352 German wounded prisoners of war were conveyed to Rotterdam.

After a brief stay in dock for a minor refit and re-storing, she returned to her former station as Hospital Ship to the Fleet at Scapa Flow,

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OUR ENEMIES.

Goethe, the greatest German poet, "the Shakespeare of Germany," as he has been called, said: "The Prussian is a born brute and civilization will make him ferocious." I wish to paraphrase this and say: "The greater proportion of people are born healthy and their method of living makes them sick. The people of America are only fifty per cent efficient on account of ill health and disease. Apparently our population is 100,000,000; actually it is only 50,000,000. This is the result of wrong feeding, cranky immoderation, not enough air and sunshine, impure and insufficient water drinking, alcohol, caffein and nicotine addiction and our awful and absurd use of drugs and patent medicines.

These are our greatest enemies. Compared to these enemies, the Huns are our warm friends. Twelve months from this hour, one single preventable disease—consumption, a consequent of wrong living—will kill 200,000 people in our United States. Heart diseases, almost wholly consequent upon wrong living, will kill another 200,000; certain infectious diseases, ninety per cent preventable (typhoid, diphtheria, scarlet fever, etc.), will kill another 200,000 and degenerative diseases (kidney troubles, hardened arteries, etc.), all due to foolish living, will kill another 200,000. Compare this slaughter with the slaughter the Huns will be able to inflict upon us.—*Bulletin of Indiana State Board of Health.*

MORPHINE AND CELL NOURISHMENT

Does morphine relieve fatigue in cells? Experiments by Ranke as early as 1865 on fatigue showed that genuine relief from fatigue was secured by nerve tissue sedatives; but sedatives being used, it must be borne in mind that cell nourishment must be furnished and made available coincidently. In addition to normal saline as enteroclysis or intravenously or hypodermoclysis, which will counteract all the secretion inhibiting effect of the morphine used, it is a most excellent thing to use intravenous injections of hypertonic glucose solutions, 100 or 200 c.c. of a 20 per cent. solution given very slowly, requiring thirty minutes for the injection is a sure method of nourishing each cell adequately for several hours.—C. M. RAMAGE, in *The West Virginia Medical Journal.*

TREATMENT OF COLLES'S FRACTURE.

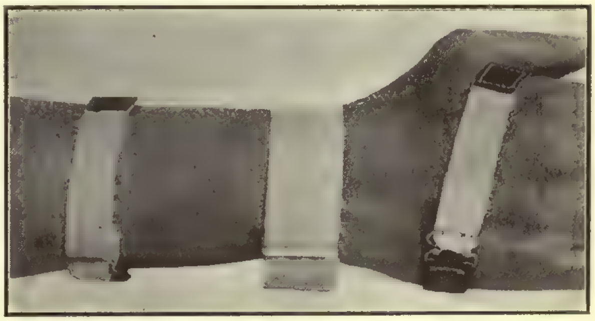
A. N. Bessesen, M. D.
Minneapolis, Minn.

Fracture of the radius near the wrist joint occurs so frequently, that every physician in active general practice must at some time attend these cases. The importance of correct treatment is self-evident.

The diagnosis of fracture of the lower end of the radius is so well known in this day that no practitioner of medicine should fail in its establishment; and the ever present roentgenologist can with certainty demonstrate the exact line of fracture when necessary. Really a wonderful satisfaction to the man who revels in refinement of diagnosis. He is able to state positively that this is a case of Barton's fracture, of Smith's fracture, of Chauffeur's fracture or of Colles's fracture. And he can give a minute description of the condition present; that it is impacted or comminuted, simple or complicated, that the fracture is near or distal to the wrist joint. But what more nearly concerns this paper is the ability to determine with clearness the accuracy of approximation of the fragments after reduction. By this means we can file a visual record of the case, that may at any time be our greatest protection against misjudgment.

The first step in the proper treatment of fracture of the lower end of the radius, is then, an exact knowledge of the condition to be treated; and this is dependent on a correct anatomical knowledge of the part. When properly reduced the normal concavity on the anterior surface of the radius is restored. The styloid process of the radius is brought into position slightly lower than the styloid process of the ulna. And the wrist is made to look as like the other wrist as possible, with all landmarks in normal relation. This can be accomplished by any physician using ordinary judgment, providing he will take the time to observe and compare the parts. Unfortunately the presence of relatives and friends tend to excite and hurry the doctor, and very seldom he may attempt to treat the fracture in a grandiose manner, resulting in dissatisfaction to the patient and in annoyance to himself. It is much better to be deliberate and careful; to give an anesthetic should the patient require it; to remove the dressings at intervals, especially at the fifth to the seventh day; and while the exudate is still plastic to correct any slight displacement. Here as elsewhere diligence may be the price of success.

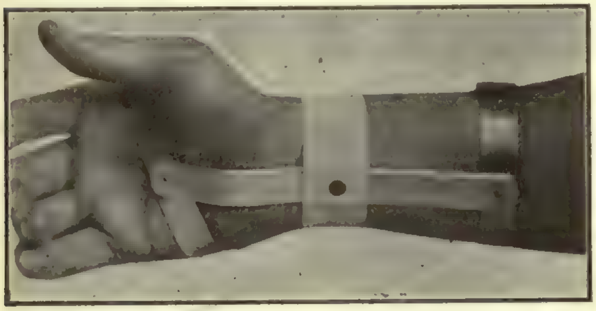
Perfect recovery may depend more on the individual care rendered than on any particular method of treatment. And it may be for this reason that equally good results are obtained with markedly different methods.



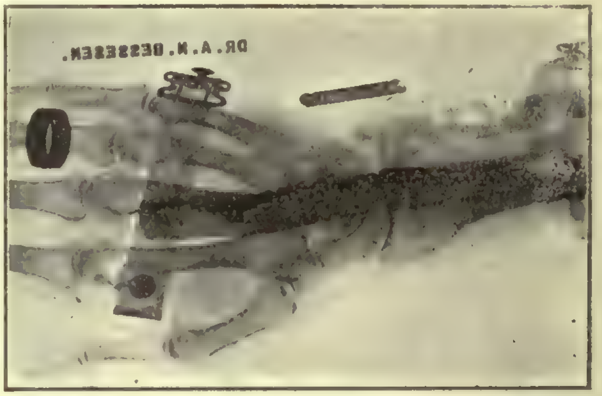
Robert Jones advocates the following as superior to the "old text book" instruction: "To reduce a left Colles's fracture, the surgeon takes the patient's arm in his left hand, with his own scaphoid tubercle against the projecting lower end of the shaft; he then places his right hand on the dorsum of the patient's wrist with his own scaphoid on the projecting lower fragment. A firm grip with a slight traction and twist of the wrist completely reduces the deformity. It requires knack rather than strength. The fragments can be retained in position by slight pressure of the finger and thumb, one on the upper fragment just above the seat of the fracture and the other on the dorsum of the wrist joint and styloid process to prevent it from rotating backward and outward. The tendency for the deformity to recur is not great if the reduction is complete, therefore the fracture is put up by replacing a pad of wool on each of these two points and retaining the pads with splints."

The text book method is performed by grasping the patient's hand as if to "shake hands" and at the same time grasping the patient's forearm just above the wrist, placing the thumb over the displaced fragment. The patient's hand is then drawn backward into hyperextension, and while pressure is exerted on the posterior surface of the lower fragment with the thumb of the hand grasping the arm, the hand is suddenly brought forward into flexion, using the ulna as a pivot while rotating the hand into pronation. It is usually necessary to induce anesthesia.

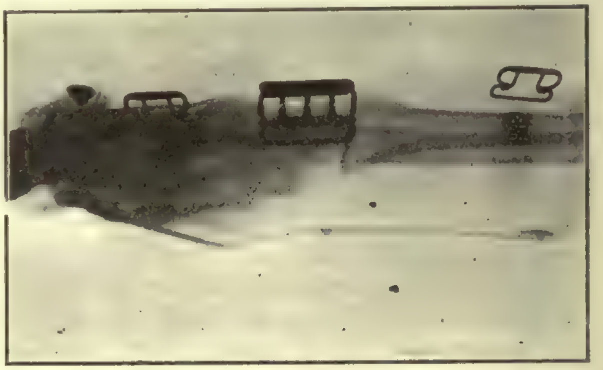
That the fragments can be retained so easily in position may account for the various methods of fixation; all the way from the old-fashioned straight anterior and posterior padded splints to the suspension cuff of Storp's without splints. The trend of treatment at present is toward the use of molded splints, such as the Jones's metal spiral splint, the Bond's splint, the Gordon pistol-shaped splint, or the Walker paper-maché splint. A plaster of paris cast should not be used in the treatment of Colles's fracture, not only because of the danger of constriction, but mainly because a cast interferes with frequent inspection. Its use in the past has probably been responsible for the larger proportion of failures. Another mistake is the early removal of splints. Some form of support should be retained for at least six weeks, even though union seems well advanced. The patient assumes that he has fully recovered when the dressings are finally rmoved, and he is liable to use the hand without restriction. Naturally the patient tires of heavy splints and bandages, and is anxious to use his hand as soon as possible; moreover, he may be sensitive as to his personal appearance. We should not, however, overlook our own interest and the welfare of the patient because of importunities. Rather should we then, provide protection for his injury that is satisfactory.



In the present state of knowledge we find it necessary to use a rather cumbersome dressing the first two or three weeks, especially should the arm be carried in a sling. Patients rarely object to this since the relief from pain is the all important consideration; but just as soon as the patient feels well enough to want to use the arm we must be prepared to meet his objections with a splint that is satisfactory. Such a splint should be light in construction, neat in appearance and inconspicuous. The patient should be able to remove and replace it at will, since at this time it may be beneficial to institute a course of massage as tending to more rapid recovery.



The writer submits a splint for this purpose that he has used the last eight years with entire satisfaction. It can readily be constructed by any experienced mechanic. The acompanying illustrations clearly show its make up and manner of use. The x-ray plates were taken from a patient after three weeks' wear and just before the splint was finally removed and replaced by an ordinary wrist strap.



Aluminum strips and leather straps are used in its construction of such weight and size as the case may require. Each intersection is fastened by a single rivet to permit of easy adjustment. The whole is shaped and fitted to the part, and buckled comfortably in place.

Note that this splint meets the requirements above outlined and also permits the limited use of the hand without risk of further injury. It is not intended to displace the stronger fixation splints, but is rather an auxiliary splint to be applied after their removal, and protects the ininjured wrist through the transition period against undue use of the hand.

This splint appears to be a modification of the Jones's short arm splint. It is intended to be worn some two or three weeks' time, when it can be discarded and an ordinary wrist strap applied and worn until full recovery.

A NEW CONCEPTION OF AMPUTATION.

James Peter Warbasse, M.D.,
New York.

The advancements of plastic surgery have made possible a new conception of amputation. The old mechanical attitude toward this subject should be cast aside. The accurately planned lines of amputation which bear the names of the great surgeons of the past should no longer be followed. It is no longer fair to future patients to teach these formulated methods to students of surgery. Our art has outgrown them.

No surgeon should entertain the idea that amputation can be reduced to a matter of rules, or that rules for amputation can be made simple and automatic. Rare judgment is required in determining when to amputate, how to amputate, and where to amputate. Indeed, the question which should more often confront the surgeon is, "Is amputation required at all?"

Amputation should be regarded as a plastic operation rather than as the lopping off of a member. *If there is living tissue beyond the proposed place of amputation, the necessity for the operation should be questioned.* The possibilities of plastic surgery are so great that the surgeon, before amputating, should ask himself, "Can I not excise the disease part and supply the deficiency by grafting?" If the disease is of the bone alone, amputation is utterly unjustifiable because bone transplantation is so effectively accomplished. In the case of tumor of the bone, the diseased segment of bone should be excised, the defect filled by a graft of bone, and the wound closed. For precisely the same reason, the surgeon should ask himself the question which regard to other structures. Bone, skin, muscle, tendons, fascia, blood-vessels, nerves, and joints are all capable of restoration and grafting.

Bone, skin and fascia may be transplanted from other parts. Muscle and tendon may be turned down and attachments changed. New tendons may be constructed. Vessels may be transplanted and grafted. Nerves may be grafted and bridged. Joints may be reconstructed, grafted, or made by interposing fascia between bones.

The principles of plastic surgery may not only be invoked to save the limb, but if the limb must be sacrificed plastic methods may be employed to make the loss as small as possible. The ancient practice in amputations has been to make a sacrifice of perfectly sound limb, including muscle, vessels, nerves and bone—in order to get skin to cover the stump. The competent surgeon must ask himself the question, "Can I not get this elsewhere, and save the muscle, vessels, nerves, and bone which must be sacrificed if I amputate higher?"

It should be borne in mind that when a limb is amputated for disease other than gangrene, the blood supply is usually more than adequate to nourish the stump. It is adapted to nourish not only the stump but all of that part beyond, which has been removed. For this reason the transverse or flapless operation is to be considered always; and the covering of the bone end undertaken with a transplanted flap of skin. In uninfected cases the transplantation may be done at once. In infected cases it may be undertaken later.

It should be borne in mind that it is easier to cut off a limb than it is to put it back or to reconstruct a new one. Rarely is it necessary to make a finished operation at the first setting. To save as much tissue as possible is usually a good rule to follow. Moreover, the surgeon should remember that the higher the operation the greater the shock. A few centimeters one way or the other may determine the difference between life and death. A well covered and symmetrical stump on a dead patient is never a beautiful stump. And so, while the typical methods of amputation are found described in text books on surgery, the surgeon should ever have in mind the lessons to be found in plastic surgery and the grafting of tissues, and make his own variations to suit the circumstances of each individual case and his own skill.

The important point is that, when confronted by a limb suggesting amputation, the operator should banish from his mind the old mechanical conceptions of sacrificing together the diseased and healthy parts with the immediate purpose of creating a perfect stump at whatever cost. He should instead view it with the psychology of plastic and reconstructive surgery.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

New York, June, 1919.

TREATMENT OF FRACTURES OF THE UPPER EXTREMITY WITHOUT SPLINTS.

Dowden, one of the surgeons of the Edinburgh Royal Infirmary, has been treating fractures of the upper extremity without splints for the past ten years, and his results have been so superior to those obtained by the conventional mobilization methods, that a report of his method and results may prove of interest. (Edinburgh Medical Journal, December, 1918). Dowden finds that his patients return to their maximum efficiency sooner than with the older methods, and moreover, never have such complications as stiff joints, delayed union, etc.

He frankly confesses himself a heretic in ignoring the prevalent notion of surgeons that displacement is entirely due to muscular action. He believes that the displacement is due to nothing but force, and that if the force is overcome the action of the muscles in maintaining the displacement can be ignored. Moreover, even if the displacement is due to the action of muscles, he cannot see how splints placed around the limb will prevent a recurrence of the displacement. Dowden cites as an example of the contradiction of this fallacy the conventional operation for bow legs. In such an ostectomy an artificial fracture above the condyles is produced, yet, nevertheless, there is no forward or backward displacement by either the gastrocnemius or the great muscles of the thigh. Dowden watched fractures of the upper extremity through the fluoroscopic screen and could see no muscular displacement when the arm was actively moved.

Dowden describes his method in individual fractures. The various forms of bandages that have been devised for fractures of the clavicle are deficient because they bring the shoulder nearer the median line. Dowden simply allows the arm to rest in a sling, supporting the wrist at a slightly higher level than the elbow. He is encouraged to move his fingers, pronate, supinate, flex and extend the forearm, and to gently move his shoulder joint. These movements should be carried *out just short of pain.* It is surprising to see how rapidly improvement takes place, and how soon the patient can put his arm into a coat sleeve. Fractures of the scapula are treated in the same way, except that in addition passive movements are carried out, especially if the fracture is near the glenoid. Fractures of the humerus are treated in a similar way. The only difference Dowden makes is that for the first few days a pasteur splint is applied to prevent the patient lying on his arm at night. Massage and passive movements are helpful aids. The patient should be encouraged to practice all the movements during the day, increasing the extent of the movements day by day, if he can. The same methods apply to compound fractures, such as were obtained by war wounds. Dowden recites a brilliant result in such an instance. Fractures of the olecranon and of the bones of the forearm are treated in the same way.

Dowden has attempted to apply these principles to fractures of the lower extremity, but thus far has not been able as yet to perfect this method.

Dowden's report is extremely interesting, and sufficiently reasonable to warrant a more extended trial.

E. M.

REHABILITATION.

The excellent results already manifest in the national plan for the rehabilitation of soldiers, sailors, and marines merit the imitation of the scheme and its application to all persons handicapped in industrial life. What federal authority alone could accomplish for the enlisted men requires the separate action of various state legislatures to be made available for workers in general.

The State of New Jersey has taken the lead in creating a Commission for the rehabilitation of physically handicapped persons. A recent enact-ment defines "physically handicapped" as meaning "any person who, by reason of physical defect or infirmity, whether congenital or acquired by accident, injury, or disease, is or may be expected to be totally or partially incapacitated for remunerative occupation." "Rehabilitation" is interpreted as meaning "the rendering of a person physically handicapped fit to engage in a remunerative occupation." The progressive law referred to provides for a State Commission to consist of the Commissioner of Education, the Commissioner of Labor, the Commissioner of Charities and Correction, and three other members to be appointed by the Governor, who shall serve without pay though their actual expenses incurred in the performance of duties shall be paid out of a state appropriation.

The various phases of the law are well developed, so as to provide for the education and training of those handicapped and provides the maintenance costs during the prescribed period of training. Provision is also made for a social service visitation to those aided and their families for the purpose of giving advice regarding any matter that may affect rehabilitation during and after the period of treatment and training. The state, also, undertakes, through the Department of Labor, to aid in the placement in remunerative employment of those physically handicapped persons so registered with the Commission.

This law possesses unusual significance, in that it is the first to be placed upon the statutes of any state carrying over the experiences of the Federal Government for the advantage of residents within a state. It is a complete recognition of the principle of state obligation and responsibility for the protection and re-education of such of its citizens as cannot ordinarily fulfill their duties to the utmost, and thus constitute a state liability.

The establishment of a Commission of this character undoubtedly will affect profoundly educational institutions and require numerous adjustments in the administration of hospitals and dispensaries. The returns to the state, however, will warrant the expenditures contemplated and result in an improvement in the character of medical and surgical service, owing to the recognition of the fact that mere cure of disease or healing of wounds do not represent the end results most desirable from the standpoint of communal welfare. Hospitals will find themselves making adjustments in their plans in proportion to their awakening to the ideas and ideals stimulating and strengthening the principle of rehabilitation.

The example which has been set by the State of New Jersey deserves emulation, and will undoubtedly create a stronger public opinion demanding reorganization in this direction. It is to be hoped that the surgical profession, appreciating the necessity of work of this character, will assume a certain measure of leadership in bringing about legislative enactments making similar provisions in all the other states which will soon begin to follow the line of action so well begun in the State of New Jersey.—I. S. W.

STIFF AND PAINFUL BACKS.

The diagnosis of the cause of stiff and painful backs demands careful examination, including the use of the *x*-ray. The frequency of these symptoms, after accidents, makes it of particular importance that the exact causation be discovered in order that proper treatment may be instituted. The necessity of unusual care is emphasized in connection with the principles of accident insurance or compensation. Dr. J. W. Sever, at the Fourth Annual Meeting of the International Association of Industrial Accident Boards and Commissions, called attention to the fact that a large number of persons presenting symptoms of stiff and painful backs were suffering from fractures of one or more vertebrae, the so-called crush fractures. Most of the persistent back disabilities were the results of falls, particularly on the buttocks, shoulders, or back, or from landing on the feet from a height, combined with forcible flexion of the spine.

In compression fractures of vertebrae, the anterior portion is more frequently crushed than is the posterior. Dr. Sever produces evidence to show that fractures of the spine may exist in many instances without symptoms other than a lame and stiff back. The reason probably is found in the fact that most of the fractures of this type occur at the level of the first lumbar vertebra.

One would imagine that a diagnosis of fracture of the spine would be readily made by members of the surgical fraternity, though the experience of the Massachusetts Industrial Accident Board has demonstrated that no diagnosis of fracture was made in many instances until after the lapse of four months, and even one year, after the accident. The real criticism is not based upon the difficulty in establishing the diagnosis, but because complete examination of the patient was not made.

Few of the patients with chronic stiffness and lameness of the back present symptoms due to nerve pressure, such as would be evidenced with a complete fracture attended with crushing of the spinal cord. This lack of nerve involvement probably arises from the fact that the spinal cord ends at about the level of the first lumbar vertebra, the point of greatest frequency of fracture, and thus escapes injury. The residual symptoms of stiffness, lameness, pain, and slight limitation in lateral bending do not entirely incapacitate for labor, but do restrict occupation to light employment.

With the requisite diagnostic skill, the site of the fracture is determined, and treatment by fixation, plaster jackets, or bone splints serves to hasten convalescence and eventually lead to a palliation of the handicapping symptoms.

It is imperative, therefore, to recognize the possibility of a compression fracture in all accidents due to falls upon the feet or back, or, indeed, from the dropping of weight directly upon the flexed spine. The forcible flexion of the spine is an important element in the causation of the compression fracture. While a kyphos is usually present, it does not present its appearance immediately, though it may be detected after callous formation begins. The significant features are the disability for heavy work, the weakness, stiffness, and painfulness of the back. These are a constant source of complaint, and, not infrequently, are regarded as evidence of malingering.

The failure to ascertain the lesion is indicative of insufficient care in diagnostic procedure. Under ordinary circumstances, it would seem unnecessary to devote editorial space to urging the thorough and complete examination of victims of accidents, but in view of the fact that so many compression fractures have been treated for months without having received a correct diagnosis, it appears timely to again call attention to the advantage of complete examinations of injured persons.

The tendency to assume that victims are endeavoring to feign distress in order to beat insurance companies or accident commissions is manifestly unfair. The injured deserve the benefit of every doubt, and doubt must exist unless and until diagnostic methods have been employed to the limit of their applicability.—I. S. W.

HOSPITAL EXPANSION.

The Children's Bureau inaugurated a conference on Child Welfare Standards in Washington as to the first of a series to be held in cities throughout the United States as the formal closing functions of the Children's year. At these conferences were representatives of England, Belgium, France, Japan, Italy and Servia, in addition to leaders in Child Welfare in the United States.

Various tentative standards were adopted for the protection of the health of children, and attention is merited by the type of service demanded in connection with the problems of infant and child welfare. Among the significant features is the emphasis which is placed upon adequate medical and dental care. Beginning with provisions of standards for maternity centers, there is a demand for clinics and maternity hospitals or maternity wards sufficient to provide care in all complicated cases and for all women wishing hospital care. There is a call for the training and registration of household attendants to act under the supervision of physicians or public health nurses for sickness in the home.

Children Health Centers are called for, with special clinics for the teeth, eye, ear, nose, or throat, the venereal diseases, and such other clinics as may be required for the treatment of defects and diseases, to be supplemented by children's hospitals or beds in general hospitals or provision for adequate medical and nursing care at the home. Coupled with these demands is the suggestion of clinics for orthopedic work and for the management of skin diseases, and nutrition classes for subnormal children. A most striking standard is the examination of all typical or retarded children by a psychiatrist.

The complete set of standards indicates a recognition of the needs of hospital development along lines essentially co-operative with the innumerable social agencies aiming to safeguard maternity, to decrease infant mortality, to conserve the health of the children during the pre-school age, and to make adequate provision for the health and welfare for children during the entire period in the educational system. It is significant of the increased strain which is to be placed upon institutions for the promotion of health, either by curative or preventive efforts. The expansion of hospital administration appears to be assured if there is full appreciation by hospital trustees of the sphere of social usefulness which is ever increasing. Obviously, county, municipal, and state institutions will be able to expand their facilities as rapidly as public interest warrants the necessary appropriations.

These transformations in the ideas of hospital systems are thoroughly in accord with the tenets of modern medical and surgical practice. There may be numerous difficulties in the way of enlarging or reorganizing hospital and dispensary plans to meet the social requirements of the modernized theory of practice. These alterations, however, will soon be accomplished, without disorganizing the existent systems of administration rather by internal improvements and adjustments than by the addition of new structures. The possibilities of redirecting hospital and dispensary energies into these new channels do not afford insuperable obstacles. The most essential factor, however, is to be found in the co-operation and encouragement of the attending staffs, upon whom rests the serious responsibility of accomplishing the desired results in hospitals and clinics. The tentative standards which have originated from these conferences merit the careful thought of all interested in promoting reforms in the interest of hospitals and clinics as well as in behalf of the community to be served.—I. S. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

A RETROSPECT AND PROSPECT.

The Department of Surgical Sociology is entering upon its tenth year. It is perhaps not immodest to call attention to the fact that when this work was begun, sociological interest in medicine and surgery was scarcely evidenced by any marked percentage of the medical profession. In the original announcement of May, 1910, occurred the following statement: "We believe that the surgical profession should be among the leaders in the movement towards better social conditions. We believe that surgeons are essentially humanitarians and are interested in all projects pertaining to a lessening of the number of accidents and diseases which human flesh is not heir to but has cruelly thrust upon it."

Our belief has been thoroughly justified. With the appearance of the first issue containing sociological discussions, one of our then contemporaries, now unfortunately defunct, commented that the subject appeared to be novel and stimulating, but probably like other innovations in medical literature, it would soon pass out of journal space. Fortunately, this approbation, but not the fear was realized.

The cordial reactions of the profession have been a constant stimulus to the department editor, to continue to interpret social progress in terms of surgery. At the time the department was undertaken, there was no medical or surgical journal addressing itself to the problems which appeared to be so intimately related to surgery in its broadest aspects. There has been a constant aim to emphasize various phases of the relations existing between the needs of society and the responsibility of the surgical profession.

Topics which today are popular and vital, ten years ago were scarcely referred to by surgeon. At the present time, industrial accidents, social insurance, the rehabilitation of the handicapped, the needs for special hospitals, clinics, convalescent homes, the advantages of district nursing, the importance of playgrounds, factory regulation, prevention of blindness, the social conditions affecting pregnancy and parturition, receive extensive attention in publications devoted to surgery, medicine, and, indeed, are almost more common in lay magazines. There were discussions of mental hygiene, occupational therapy, standardization of hospitals, social service work, inebriety, medical education, industrial hygiene, mortality statistics, fire prevention, venereal diseases, rural obstetrics, employers' liability, workmen's compensation acts, delinquency, defectives, hospital ships, preventive medicine, and public health during the first two years of the Department of Surgical Sociology.

The developments of modern surgery along social grounds were foreseen, and in the desire to encourage its rapid development, our columns have constantly reflected the advances made throughout the world.

Much of modern preventable surgery is dependent upon the recognition and understanding of the social and economic causes which in the past have been responsible for a large proportion of physical injury that might have been obviated. Scarcely an up-to-date medical journal exists which does not from time to time publish articles dealing with the interrelation of medical and surgical accidents and diseases and phases of public welfare ordinarily denominated as sociological.

The past decade has witnessed a remarkable transformation in the point of view of modern medicine. The greater emphasis which has been placed upon public health and prophylaxis has led to an awakening of conscience which now seeks to attack every problem at its source. Medicine and surgery have responded magnificently to the urge of public welfare. Marked advances have been noted in medical education, the organization of hospitals and dispensaries, and the systematic development of plans for grappling with specific phases of medical and surgical work as evidenced in the establishment of special clinics, diagnostic clinics and pay clinics, not to mention the co-operation of medical institutions to affect standardization along various lines.

There is every reason to believe that the next ten years will be of more profound influence in fashioning medicine than the ten years that have passed. The experience of the 30,000 men engaged in war work has had a profound effect upon the points of view of those who previously had lived and moved only in the narrow streets of the rural and urban districts. Their outlook is now that of the world. Their understanding of human problems has been intensified; and they are accustomed to thinking in terms of masses of men, rather than in terms of individuals. The shortcomings in their preparation for national service have been appreciated. The failures or weaknesses of medical education are not unknown. Their response to the call for greater attention to public welfare will be more immediate and will be stimulated by greater discretion, sympathy, and wisdom.

In the consciousness that the field of our work has broadened, and that the necessity for its continuance has been established, we shall endeavor to keep before our readers the most important developments in sociology and economics during the years that are to come.

The Departmental Editor desires to express his appreciation of the cordial expressions of good will which have come to him from various sources. He is not unaware of the fact that the successful conduct of a department depends upon the existence of a feeling of sympathy between the writer and the reader. This has been felt, even though personal communications have not been frequent. Contributions to the department have been few in number, but, nevertheless there have been various satisfactory evidences that the Department of Surgical Sociology has supplied a need, and had added somewhat to the usefulness of the profession.

With the first nine years as a foundation, we trust we shall continue to create and strengthen a social viewpoint which shall redound to the credit and usefulness of the surgical profession. To this aim we rededicate the Department of Surgical Sociology as an interpreter of humanity and human relationships, as related to the development of humanitarian surgery.

Creed of the Disabled.

Once more to be useful—to see in the eyes of my friends replaced with commendation—to work, produce, provide, and to feel that I have a place in the world—seeking no favors and given none—a MAN among MEN in spite of this physical handicap.—*Carry On.*

Book Reviews

Prothese Fonctionelle des Blesses de Guerre. By Dr. Ducroquet, orthopedic surgeon to the Rothschild Hospital. One small octavo volume of 236 pages with 218 original figures. With a preface by Professor Aug. Broca. Paris, *Masson et Cie.*, 1919.

Doctor Ducroquet has given us an excellent compilation of the principles which apply in the correct fitting of a functional prothesis. The monograph comes at the right moment and should be of value to those of us who, for a long time to come will have to look after the results of war injuries.

The work treats successively of the following: The points of fixation good apparatus including the choice of axis and the articular mechanism; apparatus for immobilization; apparatus for limited motion; apparatus for paralyzed limbs, etc. After the discussion of these mechanical principles there is a chapter in which the normal walking and marching movements are analyzed "a la cinematique." This is necessary in order to understand pathologic variations. The concluding chapters apply all of these principles for the various forms of disability.

Squibb's Atlas of the Official Drugs. William Mansfield, A. M., Phar. D. Dean and Professor of Pharmacognosy and Botany, Union University, Department of Pharmacy, Albany, N. Y.; Late Professor of Biology and Pharmacognosy, College of Pharmacy of the City of New York, Columbia University, and Botanist and Pharmacognosist to E. R. Squibb & Sons, etc. Published by E. R. Squibb & Sons, New York.

A handy little volume, dealing with present knowledge of crude drugs is of value to physicians and students of pharmacy and medicine. Dr. Mansfield has succeeded in providing a most excellent and handy book, classifying and describing the various drugs in briefest form. The arrangement is tabular and enriched by a photographic reproduction of the essential characteristics of each one of them. Drugs of animal and vegetable origin are considered, and each chapter contains the essential information concerning the specific part of the drug employed in pharmacy, to indicate the guiding characteristics for determining products of the highest character.

No single book is more complete or possesses greater usefulness as a work of reference in pharmacognosy.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M.D. Assisted by Leighton F. Appleman, M.D. *Volume* 1. March, 1919, Surgery of the Head, Neck and Breast—Surgery of the Thorax, Excluding Diseases of the Breast—Infectious Diseases, including Acute heumatism, Croupous Pneumonia and Influenza—Diseases of Children—Rhinology, Laryngology and Otology. Lee & Febiger, Philadelphia and New York, 1919.

Beginning with an excellent discussion of surgery of the head, neck and breast by Charles H. Frazier, of which a large part is devoted to considerations of the brain, the present number is rich in information concerning the diseases of children and the infectious diseases, including acute rheumatism, croupous pneumonia, and influenza. The contributors to the volume in addition to Dr. Frazier are Dr. George P. Müller, John Ruhrah, Floyd M. Frandall, George M. Richards. The general high standard of excellency is continued.

The After Treatment of Wounds and Injuries. E. C. Elmslie, M. S., F. R. C. S. Brevet Major R. A. M. C. (T. F), Special Military Surgical Hospital, Shephard's Bush; Surgeon-in-charge of the orthopedic, physical exercise and massage depts. St. Bartholomew's Hospital; Surgeon to out-patients, Metropolitan Hospital; Orthopedic surgeon to Queen Mary's Hospital, Roehampton; Consulting orthopedic surgeon to the Foundling Hospital and National Children's Home and Orphanage. Octavo of 323 pages with 144 illustrations. Philadelphia, P. Blakiston's Son & Co., 1919. Price $4.00.

Those of us who will learn most from this war in a medical way will be the neurologists and orthopedists; and most of the work of this kind will be done after the war and will occupy us for years to come. In a general way this statement indicates the scope of this volume: a discussion of wounds of bone, joint and nerve; of the best methods for healing the wounds; of the best methods for regaining all the function it is possible to gain out of a mutilated limb or ankylosed joint. The fund of knowledge exhibited in the book is based on a wide experience and in its transmission to all of us it ought to prove of much benefit.

Essentials of Surgery. A Textbook of Surgery for student and graduate nurses and for those interested in the care of the sick. Archibald Leete McDonald, M. D., The Johns Hopkins University. Formerly in charge of department of anatomy, University of North Dakota; Lecturer on Surgery, Nurses Training, St. Luke's Hospital, Duluth, Minn. Octavo volume of 265 pages and 46 illustrations. Philadelphia and London: J. B. Lippincott Company, 1919.

This book covers the general principles of surgical diseases and the pathological changes which result. Also, under separate headings, the more important surgical lesions of the body are considered. The matter is presented simply, and only general statements are made concerning; etiology; pathology, local tissue changes produced and general effects; natural course of disease; indications for treatment. No attempt is made to discuss technical nursing methods, except special indications for their use.

The Early Treatment of War Wounds. By Col. H. M. Gray, C. B. C. M. G., M. B. Aberdeen, F. R. C. S. Ed., Consultant in Special Military Surgery, late Consultant Surgeon British Expeditionary Forces, France. Small octavo volume of 299 pages. London: Henry Frowde and Howder & Stoughton, 1919.

Little time is available in these busy days for reading multitudinous and long dissertations on the various espects of military surgery, especially so for those among us who must do the work. Many changes have come about from the beginning. And, so, ripe with an experience of three and one-half years, Colonel Gray gives us, in as short as possible a space, a very full and very accurate account of all the essentials that the younger and the older surgeon need know about correctly and efficiently taking care of war wounds.

The plan of the book follows the road the wounded man travels from the front to the rear. Much is given of the initial treatments, of the care of shock, of the different kinds of antiseptics and dressings. A valuable chapter deals with the principles of treatment. Finally special chapters are given devoted to the brain and spinal cord, to the thorax, and to compound fracture of the femur.

The volume should prove very valuable to military men.

Lice and Their Menace to Man. Lieut. L. Lloyd, R. A. M. C. (T), Chief Entomologist in Northern Rhodesia. With a Chapter on Trench Fever, by Major W. Byam, R. A. M. C. London, Henry Frowde, Hodder & Stoughton, Oxford University Press, Warwick Square, E. C. 1919. Pp. 136.

The miserable pediculus has been dignified to the position of a creature of importance in view of our experience with it under war conditions. The publication of a monograph upon this subject is most welcome. From every point of view the subject matter is most satisfactory. The range of material involves the structure of life, history, and habits of the body louse, with chapters on its dissemination and disinfestation. The head louse and crab louse also receive brief, but adequate treatment.

From the medical standpoint, the three concluding chapters dealing with relapsing fever, typhus fever, and trench fever are of the greatest importance, and afford an excellent résume of our present-day knowledge, and their dependence upon lousiness.

The purpose of the volume is to supply an adequate degree of information for the general reader, and does not aim to serve as a heavy compendium of information for those who have specialized in conditions relating to the natural history of the louse, or in the diseases which may be occasioned by its presence.

Incidentally, it may be stated that the typography is unusually creditable.

The Disabled Soldier. Douglas C. McMurtrie. Director, Red Cross Institute for Crippled and Disabled Men. President, Federation of Association for Cripples. Editor, American Journal of Care for Cripples. With an Introduction by Jeremiah Milbank. Vice-Chairman, Committee of Direction Red Cross Institute for Crippled and Disabled Men. New York, The Macmillan Company, 1919. Pp. 232. Price, $2.00.

The problems of rehabilitation have given rise to much discussion with reference to methods and values of retraining handicapped adults. While McMurtrie's volume is entitled, "The Disabled Soldier," the title might just as well have been extended to cover "Disabled Adults Whether in Military or Civil Life." The book is a most valuable compendium of recent experience in England, France, and the United States, and individual chapters have been carefully checked up by individuals whose experience warranted that consultation as special authorities.

Particularly commendable and advantageous is the literary form which has been employed, which aids greatly to the readability of the volume, and which makes its assimilation a great pleasure.

From a technical standpoint, the chapter headings represent more the type employed in a modern novel, and do not indicate sufficiently the exact nature of the subject matter. This is a serious defect in view of the fact that there is no index to enable one to find easily any specific facts or any indications of where information is located in the book. The wide field of information which is traversed warrants, however, a careful reading of the book, and, in all probability, this has been relied upon to offset the disadvantage in structure. The illustrations are well selected, and excellently reproduced. All those interested in restoring handicapped individuals to their potential usefulness will find a wealth of suggestion, fact and inspiration in this splendid and illumining volume.

Surgical Clinics of Chicago. *Volume* 3, *number* 1. 276 pages with 275 illustrations. W. B. Saunders Company, Philadelphia and London, February, 1919.

This volume follows in the lines of its predecessors and contains a number of very excellent clinics all of which are written in their usual excellent way and are amply illustrated. Deserving of special mention are the clinics of Dr. Beck, Major Kellogg Speed, Dr. Bevvan and Dr. Orth.

Books Received

Colloids in Biology and Medicine. Prof. H. Bechhold. Member of the Royal Institute for Experimental Therapeutics in Frankfort A. M. Authorized Translation from the Second German Edition, with Notes and Emendations, by Jesse G. M. Bullows, A.B., M.D. Assistant Clinical Professor of Medicine, Fordham University, Adjunct Professor of Clinical Medicine, New York Polyclinic School and Hospital, Visiting Physician Riverside Sanatorium, Associate Visiting Physician, Willard Parker Hospital, New York City. 54 Illustrations. New York, D. Van Nostrand Company. Pp. 464. Price, $5.00, Net.

Progress in Surgery

A Résumé of Recent Literature.

The Importance of Diagnosis in Pelvic and Abdominal Surgery and Some of the More Common Errors.

E. E. Montgomery, *American Journal of Obstetrics, etc.*, March, 1919.

Montgomery believes that the following forces are at the command of the surgeon for correct diagnosis:

1. A carefully written history of the previous health of the individual and the course of the present illness.
2. A careful study of the affected organ and its physical signs as well as those originating from organs remote which may possibly exercise a baneful influence, and which often present a group of symptoms similar to those arising from actual disease of the considered organ.
3. The chemical and microscopical study of the blood, secretions and excretions.
4. The employment of the Röntgen rays.

He emphasizes the importance of carefully examining the pelvic organs and the gastro-intestinal tract in simple hemorrhoids before operating. The investigation of the rectum by palpation should be a routine part of the first examination of every woman suffering from pelvic disease.

The most frequent seat of error in diagnosis is found on the right side of the abdomen, especially in regards to appendicitis and inflammatory conditions of the tube, eitopic gestation with or without rupture, torsion of the peduli of an ovarian or broad ligament eyst, disease of the ureter, disease of the right ureter or the passage of calculi, or empyema of a dragging gall-bladder. A brief differential of these various conditions follow.

The diagnosis of pelvic tumors may also be a point of confusion for the surgeon but careful examination will usually reveal the true nature of these growths.

Contraindications to the Use of Hydrostatic Bags in Obstetrics.

E. T. Hull, *American Journal of Obstetrics, etc.*, March, 1919.

Hull does not intend to minimize the usefulness of bags in well-founded indications, such as cases of accidental hemorrhage, eclampsia, incomplete placenta previa, certain cases of dry labor, and occasionally overgrowth of fetus after a number of pregnancies. But great care as to the condition of the mother, the condition of the cervix, uterine inertia, complications such as severe hemorrhage, threatened edema of the lungs, tonic uterus or ambe failure of cardiac compensations should be taken.

Contraindications are a rigid cervix, uterine inertia, where great haste is necessary in the complications mentioned above, a contracted pelvis with a true conjugate of 7-7.5; complete placenta previa with a viable child and the presence of virulent infection of the external genitals or vagina.

Hull assails the routine use of the bag at term for "delivery by appointment." There is a considerable danger in its use, even in selected cases. To prevent dystoria from soft parts in normal cases, avoid the introduction of a bag before the lower segment is prepared, and better, allow spontaneous labor to institute itself. We have no means of determining in an unborn child the degree of vitality it possesses, or whether it has developed its functions sufficiently to take up its extrauterine existence. Prematurity is frequently present in these babies who do badly in spite of every up-to-date facility for care, and may be the result of bagging for premature induction or a mistaken estimation of full term.

Control of Nausea and Vomiting of Pregnancy by Intramuscular Injections of Corpus Liteum Extract.

J. C. Hirst, *American Journal of Obstetrics, etc.*, March, 1919.

Based upon the theory that there is a deficiency of corpus luteum absorption during the period of nausea and vomiting, Hirst has injected the extract intramuscularly into 111 private patients. In the average case, a dose of 1 mil. every other day for 5-6 doses is sufficient for response, especially when the nausea is on the decline. In the more severe cases, where nausea is constant, 1 mil. daily for from 12-15 doses should be administered. Rest and curtailment of activity are essential during the period of treatment. All injections are given deep into the muscle. Hirst uses the deltoid.

Ninety-nine of the 111 were entirely relieved or made comfortable. Four were made distinctly worse by the treatment. Of eleven cases of pernicious vomiting, five failed to respond to treatment. There was also a marked sedative action, obtained in markedly neurasthenic cases. He is now giving a routine series of twelve doses, a smaller amount usually allowing a return of the nausea. If no effect is obtained by this number, it is not worth while to persist. In favorable cases, relief usually comes suddenly after the fourth or fifth dose.

The ideal material for use would be of human origin, but this is impracticable. The commercial extract is prepared from the ovaries of sheep, cow or pig and about 90 per cent. of the animals are pregnant.

Induction of Labor by the Use of Bougies.

C. Foulkrod, *American Journal of Obstetrics, etc.*, April, 1919.

After making complete trials of all the known methods, Foulkrod has been using the following method for two years:

Two silk bougies are ussed with or without iodoform packing. The cervix is dilated sufficiently by the fingers so that two fingers can be introduced anteriorly to the child's head and so that the bougies can be watched entering the uterine cavity without bending. The membrane around the internal os is also carefully separated. The bougies, well lubricated, are then passed up between the membrane and the wall of the uterus without membrane puncture. When two bougies are so placed, the cervix and vagina are packed with gauze.

The patient is then returned to bed and the onset of the labor awaited. If it doesn't occur in two days, the bougies should be changed.

Multiparae generally react much better than primiparae, pursuing a regular course of labor securing complete dilatation with spontaneous expulsion of the child. Primiparae have a more tedious process. The author uses a dose of morphia at the crest of the pains, not enough to stop the labor but sufficient to relax the cervix. If this fails small doses of strychnine combined with codeine are given hypodermatically every three or four hours which results eventually in bringing the head through the cervix into the pelvis ready for delivery.

The Status of Uterine Curettage Based on Hospital Records.

R. M. Rawls, *American Journal of Obstetrics*, April, 1919.

From figures based on the work at the Women's Hospital in the last eleven years, Rawls shows that curettage has been done too frequently upon the slightest indication and as a cure-all in gynecology in the past. About 96 per cent. of gynecological cases show no endometrial changes and therefore curettage is unnecessary. In only about 4 per cent. showing endometrial changes is the proceedure of questionable therapeutic value. As a diagnostic measure it is of practical value in only 5.1 per cent. of carcinoma of the uterus. When curettage is performed in a hospital and by skilled operators, there is a morbidity in at least 5.5 per cent.

Water Accumulations in the Foetal Abdomen Obstructing Labor.

W. A. N. Dorland, *American Journal of Obst. and Dis. of Child.* April, 1919.

Dorland emphasizes the fact that the term "fetal ascites" has been used to include a number of pathological entities. The following distinct conditions are now recognized:

I. An accumulation of serum in the fetal peritoneal cavity—true "fetal ascites."

II. A collection of fluid distending the urinary tract of the fetus (bladder, ureters, and venal pelves) comprising the so-called "retention of fetal urine."

III. A collection of fluid in the tissues of the fetal body (head, trunk and limbs) forming the condition known as "general anasarca of the fetus," "general edema of the foetus," or true "fetal dropsy."

IV. Cystic degeneration of the venal structure of the fetus—"congenital cystic kidney."

V. Cystic degeneration of the fetal liver.

VI. Fluid distention of the genital tract of the fetus (vagina, uterus and tubes.)

Very complete discussion of the various conditions are entered upon. A case of the first group is reported.

The treatment of these cases consists primarily in traction. If this fails, aseptic puncture of the fetal abdomen or thorax is indicated. Too much importance cannot be laid upon the early recognition of the cause of the obstruction followed by prompt operative interference. A complete bibliography is attached.

A Nonoperative Procedure for the Treatment of Cervicitis and Endometritis. A. R. Hollender and W. M. Gratist, *American Journal of Obstetrics, etc.*, April, 1919.

If there is an erosion of the cervix, an initial application of 40 per cent. silver nitrate to the eroded surface and into the cervical opening is made. One dram of Beck's bismuth paste (a mixture of 10 per cent. bismuth subnitrate and 90 per cent. vaseline) is then injected into the cervical canal either by means of a glass intrauterine syringe or a special metal syringe. The paste must be cold so that it won't pass upwards into the Fallopian tubes. As a rule from two to four injections weekly will effect a cure in a comparatively short time. There is no danger in the use of freshly-prepared bismuth paste gauze for vaginal packing.

A pregnant uterus is an absolute contraindication for these injections since abortion will be caused. Of twenty-one cases treated by the authors since their preliminary report, all but four have already been discharged as cured.

Needless Operations. J. O. Polak, *American Journal of Obstetrics*, April, 1919.

Polak decries the growing multiplicity of needless operations, done without proper indications, or with faulty technique or principle. He believes that the following are the reasons for this promiscuous and indiscriminate operating:

First—Defective training, not only in general medicine, but in pathology, diagnosis and in the clinical course of disease.

Second—Careless preparation and lack of careful diagnosis.

Third—Poor technic, especially as shown by "follow-ups."

Fourth—Poor judgment, with lack of proper conference with medical confreres.

Late Results in Stomach Surgery. Arnold Schwyzer, *Minnesota Medicine*, April, 1919.

This paper gives Schwyzer's end results for stomach operations. Of 26 cases of carinoma 5 are living after intervals of from 3 to 13½ years without recurrence. In the benign (ulcer) cases gastro-enterostomy yielded good results in pyloric ulcers, in 19 of 22 cases, and in duodenal ulcers in 17 of 19 cases. Schwyzer believes that if the latter cases go one year without symptoms the likelihood of the good effect persisting is very excellent. Of five pyloroplasties one was moderately and one greatly improved, 2 were cured.

Carcinoma of the Small Intestine. E. S. Judd, *Journal-Lancet*, April 1, 1919.

Carcinoma of the duodenum is much less frequent than that of the small intestine in the Mayo series, in contradistinction to other reported statistics. About 70% of all duodenal carcinomas are at the ampulla, but the exact point of origin is frequently difficult to determine; the origin may be the mucosa of the ampulla or ducts, or the head of the pancreas. Carcinoma occurs in the jejunum either as a degenerated polyp or as a ring tumor; the same varieties occur in the ileum. Cases of multiple growths in the small intestines have been often reported; several have been present in the series reported by Judd. Tumors may coexist in the stomach and small intestine, or in the small and large intestines. The series consists of 24 cases; these are compared with 1,689 cases of stomach carcinoma and with 1,822 cases of carcinoma of the large intestine occurring in the same period of time.

Duodenectomy. J. J. Moorehead and H. E. Landes, *Journal American Medical Association*, April 19, 1919.

A new experimental method of duodenectomy has met with some success at the Hull Physiological Laboratory, University of Chicago. The authors give the nerve supply and physiology of the organ and review the former attempts that have been made for its experimental extirpation. The difficulties that have been experienced probably gave rise to the supposed vital function of the duodenum, and the variety of methods used indicates the obstacles encountered. Their method is described in detail, but does not lend itself well to abstracting. It is performed in three stages, with a two weeks' interval between the successive operations. In the first stage the gastro-enterostomy is performed with closure of the pylorus, and gastro-jejunostomy. The biliary and pancreatic secretions are preserved by transplantation of the bile duct and the major pancreatic duct into the jejunum, which is thus made a substitute for a duodenum. Lastly, the duodenum itself is removed after having thus been put out of use. They have operated thus on dogs, which survived in normal health, and they conclude therefore that the duodenum is not essential to life.

Gastric Hernia. C. C. Booth, *IJournal American Medical Association*, March 29, 1919.

The report of a case of hernia of the entire stomach through a 1½ inch stab wound received in a drunken brawl. The tumor was about 10 inches in diameter, strangulated and almost spherical. It was raised on each side as far as possible, with the patient etherized, and the skin painted with a 5 per cent. solution of iodin and the lower edge enlarged. The stomach was then gradually restored to the abdomen, the wound cleansed with iodin and closed. The patient made an uneventful recovery, with the exception of a stitch abscess that caused some delay in complete healing.

Rupture of the Mediastinum. C. A. Wilson and R. G. Jones, *American Review of Tuberculosis*, March, 1919.

Wilson and Jones report the following case from the New Mexico Cottage Sanatorium, Silver City, New Mexico: A woman with far advanced tuberculosis confined largely to the right side was treated with artificial pneumothorax, receiving injections every three to ten days days from November to January. At each operation a small pocket was encountered and small injections produced high positive pressure so that no progress was possible. On January 23, 1918, an injection of air was attempted. About 150 cc. raised the pressure to high positive. A little more was given and a distinct snap was heard by the operator, nurse and patient. This was considered to indicate the breaking of an adhesion, for thereafter 350 cc. additional flowed freely into the chest with greatly reduced pressure. *x*-ray examination then revealed a small pocket of air on the right with firm adhesions between the lung and diaphragm. A larger pocket of air was to be seen on the left side and undoubtedly there was a communication between the right and left pleural cavities. The authors give their reasons as to why they consider the case one of air-communication through a ruptured mediastinum rather than one of double spontaneous pneumothorax; and mention that they have been unable to find the record of a similar case in the literature.

Bladder Perforations Seen at the Front. Capt. George F. Cahill, *International Journal of Surgery*, April, 1919.

Bladder wounds are caused most commonly by high explosive shell fragments, next commonly by bullet or fragments of hand grenade. Perforations were seen from any angle or direction, through chest, abdomen, pelvis, etc. All intraperitoneal wounds were associated with visceral injury most commonly of the small intestine, the major part of the injury then being intraperitoneal. The condition of the patient had great influence, and the chances of success were better the sooner they were operated upon. The mortality ranged from 30 to 70 per cent. Extraperitoneal wounds were less common and comparatively easy to diagnose. In the recent cases of the latter type repair of the bladder wound extraperitoneally, with removal of all foreign material and catheter drainage gave good results.

Plastic Repair of Urethral Defects by Venous Transplantation and Mucous Grafting. J. Tanton, Paris, France. *Urologic and Cutaneous Review,* May, 1919.

The literature concerning this question is discussed very fully and the author describes his own results with transplantation of venous segments as very good. For the success of the operation rigod asepsis is essential. Jones has also reported attempts to restore a urethral defect by making use of an appendix. One case is described where a defect was made good by a graft of vaginal mucous membrane obtained during the course of a vaginal plastic operation; an excellent result was obtained. Good results were also reported by Schmieden.

The x-Ray Treatment of Tubercular Epididymitis and Orchitis. Abraham Hyman, *Urologic and Cutaneous Review,* May, 1919.

A preliminary report is given of the results of x-ray treatment of tuberculosis of the testicle. These were so gratifying as to encourage the writer to have other cases treated by the same means.

Varicocele. W. A. Angwin, *Journal American Medical Association,* March 29, 1919.

Varicocele is a frequenf cause of disability in the navy, on account of the complaints of reflex or psychic nature attributable to it. Size alone is not an indication for operation, as it is frequently symptomless, while local plan or psychic disturbances, anxiety or worry over a possible defective genital condition may warrant an operation. The operation is divided by Angwin into six steps: the incision; the bringing the spermatic veins in view without disturbing the vas or its circulation; use of crushing hermostats to the veins; securing the cord with a nonslipping ligature: the further disposal of the cord; closing the supercial tissues, and providing suspension of the testicles. Most operative methods include the lifting the cord from its bed which increases the postoperative induration. Induration, itself, should be a rare sequel. The spermatic artery is excised with the spermatic veins without attempting to separate it. He quotes the authority of Bevan as to there existing two sources of blood supply for the testis, namely the spermatic vessels, and the other vessels accompanying the vas, either of which suffices.

Thoracic Injuries. H. Lilienthal, W. M. Brickner, and W. A. Kellogg, *Journal American Medical Association,* March 22, 1919.

A report of their work at Evacuation Hospital No. 8, during the forty-nine days of their stay. Two hundred and fifty patients were treated and a total of 340 operations performed. There were sixty-seven cases of thoracic injury, or about 27 per cent. of the total. The hospital was well equipped with laboratory and operating rooms, and the asepsis was as perfect as could be expected. Most of the patients arrived within twenty-four hours of receiving their wounds, the shortest period being about four hours and the longest six days. About one-third were in shock on admission, and a certain degree of vital depression, hardly amounting to actual shock, was present in nearly all, and they might be considered as poor risks in a general way. Hence the attempt to extract all foreign bodies was abandoned early, and the free exploration of the thoracic cavity was reserved for cases that had undergone such damage as to make early repair necessary. The complication of fractured ribs may be considered one of the most dangerous in thoracic wounds. It invariably leads to infection, especially when spicules of the bone have entered the lung. Great care was, therefore, taken to clean up splintered ribs and extract loose fragments in every open sucking wound; that is, those in which there is a free access of air to and from the lung through the wound. Probably the simplest method to overcome the condition for the time being is by simple skin suture or by firmly covering the wound with soaked wet gauze. Large, sucking wounds presuppose gross injury to the lung and other structures, besides the probable implantation of infected material. The mortality in such open, sucking cases is 40 per cent. Penetrating wounds, leaving the missile in the chest and no wound of exit, give a mortality of 30 per cent., while perforating wounds with entrance and exit had a mortality of only about 10 per cent. These patients generally suffer little and there is no call for large operations, especially with wounds from hot, machine-gun bullets striking the chest squarely and not tangentially. Estimation of mortality, however, from work solely at the front can hardly fail to be misleading. Bullet and shell fragments injuring the thorax were very similar in their mortality rate. There were twenty-two bullet wounds with twenty-seven per cent. of deaths, and sixteen shell-fragment injuries with 25 per cent. mortality. Bullets striking the ribs at a slant inflict injuries of great magnitude. Several cases are briefly detailed. The diagnosis of hemothorax is easy, especially in recent cases. Flatness on percussion with strong voice conduction are characteristic, and the fluoroscopic examination is confirmatory. A recent hemothorax, not requiring a cutting operation, may be treated by emptying it with a trochar and a cannula. This procedure is described later. In the intelligent after-treatment of chest injuries, fluoroscopy in the vertical posture is a necessity. To locate foreign bodies, ether or local anesthesia had to be used in most cases, as the nitrous oxid apparatus could not be secured until ten days before the departure of the team. The operative procedures are described in a general way, and a number of cases are reported in more or less detail. The authors close with the following conclusions and remarks on an acute traumatic atelectasis which they cannot explain and suggest animal experimentation for this purpose. The theory is also advanced that this is a true spastic condition of the lung caused by visceral muscular contraction, often an effort of nature to draw the lobe away from a point of local irritation. "Conclusions: 1. The wounds seen in evacuation hospitals may be divided into two classes: (A) Those which demand repair of obvious injuries to the chest wall, such as large open wounds or extensive fractures of ribs with probable injury to lung. (B) Injuries to the lung, or large foreign bodies in the thorax which demand exploration. Wounds in Class A should be treated on ordinary surgical principles and the wound closed as well as possible. In the presence of large defects in the pleura, stopping the opening by suturing the inflated lung as a plug should be performed when there is not sufficient other tissue for the purpose. Wounds in Class B should be operated on by what I have denominated major intercostal thoracotomy without resection of ribs. With the aid of a well constructed rib retractor an ample opening can be made through which all parts may be clearly inspected and through which operations on the lungs, diaphragm and most parts of the chest wall can be performed with comfort to the operator. In concluding the operation the ribs may be easily brought together and the pleura fully approximated by three pericostal sutures of absorbable material (kangaroo tendon or chromicized catgut). Whether or not there should be approximation of the skin is a matter to be decided in each case. 2. There may be combinations of Class A and Class B by extending an already large wound in any part of the chest. The principle of visual exploration with the aid of a rib spreader can be here applied. 3. Some kind of forced anesthesia, such as the intrapharyngeal method already referred to, is absolutely necessary in treating recent wounds of the thorax by full exploration. 4. All thoracic wounds should be under observation for not less than ten days at the evacuation hospital, and, even then, we are not sure that complications, mechanical or by infection, may not occur at a later period. 5. Pneumonia of the opposite lung is the greatest immediate danger in these cases. While its cause is unknown, we should guard the patients against cold and exposure, especially during the change of dressings."

Defibrination of Blood. F. H. K. Reynolds, *Journal American Medical Association,* April 12, 1919.

Reynolds suggests an apparatus for the defibrination of blood which he has found to give excellent results. It consists of a simple Erlenmeyer flask with a cork to fit and a special or a piece of looped wire, attached, preferably of copper. When the blood has been aseptically introduced into the glass the latter is shaken vigorously with a motion like that of ringing a bell. After sufficient shaking, the cork is removed, and the fibrin closely adhering to the loop or spiral of wire, the defibrinated blood is left in the flask.

Magnesium in Cancer. S. Itami, *Journal American Medical Association,* March 29, 1919.

Itami notices a recent article by Dubard recommending the use of magnesium salts for patients after operation for cancer to prevent recurrence, and recalls former similar recommendations. He remarks that it is fortunate that experimental cancer research permits such suggestion to be tried out in the laboratory where animals are available, rather than testing them at the risk of human life. He mentions three types of mouse cancer, two of which are transplantable. One of them (Bashford's 206) often recedes after several weeks' growth. He found that the intravenous injection of magnesium chlorid, even in doses relatively five or eight times as large as that fatal for man, was without effect on this type of mouse cancer, although two or three treatments were given within two or three days. Not only were there no tumors cured in 175 animals but in one, which was being injected with a view to preventing if possible the recurrence of a spontaneous neoplasm, previously extirpated a secondary growth appeared about three weeks after the eighth injection, and furthermore a new spontaneous tumor arose during the treatment. The true carcinoma nature of the tumors in all cases was tested microscopically. Since mouse carcinomas are quite comparable to those of men in their behavior, these results would seem to throw doubt on the value of magnesium in the treatment of human neoplasms. In fact, Itami says, the assertion may be ventured that it is useless for such a purpose.

Fractures Considered as Potential Deformities. M. S. Henderson, *Minnesota Medicine,* May, 1919.

Following a fracture of the shoulder joint the common disability is lack of abduction and external rotation; in the region of the elbow, lack of flexion; and in the wrist the characteristic fork deformity with inability to close the fingers firmly. A fracture in the hip does not unite unless adequate fixation is provided. A supracondylar femoral fracture limits flexion and extension and interferes with proper weight bearing. Pott's fracture produces bad weight bearing power by the valgus deformity. All of these are potential for any of these fractures and should be guarded against by proper reduction and alignment of the fractures.

Gunshot Injuries to the Joints. Robert B. Osgood, *Journal of Orthopedic Surgery,* May, 1919.

The essentials of the treatment advised include:

1. Fixation and traction applied early and thoroughly and continued in transport until a hospital is reached.
2. Early careful examination, radiographic, bacteriological, and clinical, at the earliest possible moment. This should be done by a competent person able to operate immediately and in good surroundings not far from the line where the patient can remain under close observation until convalescence is established.
3. Primary, delayed primary, or secondary closure of the wound in all operative cases by a special technique now sufficiently well established to be regularly followed which in secondary closures involves a thorough knowledge of the Carrel-Dakin technique.
4. Expert after-treatment to assure most perfect function.

The Mensurgraph: A Method of Measuring and Plotting Orthopedic Deformities by Photography. Theron Wendell Kilmer, *Journal of Orthopedic Surgery,* May, 1919.

The method is a photographic one which by the aid of an ordinary plotting sheet is enabled to record the degree of any deformity when originally seen, and, by comparison with subsequent similar observation, to record any progression, or retrogression, or other change of the abnormality.

Impairment of Function of the Hand Due to War Injuries. Carleton R. Metcalf, *Journal of Orthopedic Surgery,* April, 1919.

One must distinguish between old and recent wounds. With recent wounds especially of the soft parts primary or delayed primary suture is the method of choice. Joints which are involved in any way are treated by daily movement and massage. Joints so extensively involved as to make ankylosis certain are to be placed in the most useful position. In old cases benefit may be sometimes seen after gradual mobilization. Joints involved only because of invalidated tendons are occasionally helped by tendon transplantation followed by mobilization. If mobilization is impossible amputation is occasionally necessary. A simple method for differentiating nerve lesion and organic from the functional is described. It is emphasized that proper preparation of a territory for a nerve recovery by stimulation, massage and proper splinting. The prevention of contractures is all-important.

Tonsillectomy in Myositis. H. I. Lillie and H. R. Lyons, *Journal American Medical Association,* April 26, 1919.

Lillie and Lyons discuss 200 consecutive cases in which operation by tonsillectomy was performed for myositis and arthritis. That the tonsil is a focus of infection is generally recognized, and the present paper is a survey of results reported in answers to letters of inquiry sent out to 400 patients who had been consecutively operated on. The answers of the first 200 were accepted as sufficient data. The authors recognize the fact that the time element and the improvement that sometimes follows without treatment should be considered. The series includes all types of cases from the mild myositis to the severe deforming arthritis of infections origin. The cases were all operated on between July 1 and Dec. 31, 1917. Eighty-seven of these patients were aged 30 years or less, and 113 were 31 or more. Of the first group, 71 were better after tonsilloctomy, and 88 of the second group or 113 patients, thus indicating that as the condition becomes more chronic less benefit is derived from the operation. The average age of patients who have reported their condition worse was 40 years, and the duration of the myositis or arthritis in all the cases ranged from a few days to 39 years. The average duration of the cases improved by tonsillectomy was eight years. Four of the ten whose condition was chronic and who were invalids at the time of operation reported improvement. In the cases of pyorrhea or tooth-abscess, shown clinically and by roentgen ray, 81.4 per cent. were improved and 45.4 per cent. had no dental work done, while in 18.6 per cent. of the patients who were the same after tonsillectomy, 12 per cent. had had dental work done besides. Too much emphasis cannot be placed on the care of the teeth in the cure of these patients. The size of a tonsil is of variable importance as an indication for tonsillectomy. "In the Mayo Clinic reports and advice on tonsils are based on three main factors: (1) the result of properly expressing tonsillar crypts with a tonsil explorer: (2) the tonsil history, and (3) the patient's symptoms. The size of a tonsil is estimated on a scale of 1 to 4; 1 represents the submerged tonsil; 2 the tonsil that is just visible; 3 the tonsil presenting in front of the tonsillar pillars, and 4 the very large obstructing and pendulous tonsil." In the present series the average size was 2, those just visible in the cursory examination of the throat and which are generally looked on as harmless. In 6 per cent. of the 200 cases, a tonsillectomy had been attempted elsewhere without improvement, thus showing the importance of a clean tonsillectomy in all cases. An account is given of the previous history of the disease for which the tonsillectomy was performed, and in the entire series only 57.7 per cent. of the patients gave a previous history of tonsillitis. A special study was made of twenty-eight selected patients, who had a severe form of chronic infective arthritis. Their average age was 37 years, and the duration of the disease from ten months to eight years. Of these, 16 per cent. reported improvement. The authors summarize their conclusions as follows: "1. It is justifiable to advise a tonsillectomy in every frank case of myositis or arthritis. 2. A marked improvement may be assured from tonsillectomy alone in 79 per cent. of all cases. 3. It is necessary to remove all possibility of dental sepsis; by so doing a larger percentage of patients will be improved. The duration of the myositis or arthritis is a factor in the ultimate results, although benefit and even complete cure is obtainable in some long-standing, chronic cases. 5. Forty per cent. of the patients with chronic myositis or arthritis who are invalids will respond favorably to tonsillectomy. 6. The size of a tonsil has no bearing on its possibility as a focus of infection. A careful expression of the tonsillar crypts and a history of throat trouble associated with or not associated with the myositis or arthritis is essential in the diagnosis. 7. An absence of a history of diseased tonsil in no way eliminates the organ as a focus of infection. 8. A clean tonsillectomy, with the removal of the plica tonsillaris, is necessary in every case."

Varicose Veins. F. W. Kappelman, *Journal American Medical Association*, April 26, 1919.

Describes a method of treating varicose veins by injection of hot sodium chlorid into their lumen. He says he realizes the responsibility of introducing a new surgical method and mentions the discouragements he received on describing the methods to others. The object is to obliterate the lumen of the vessel in situ by destroying the intima and causing complete atresia of the vein. Of the problems to be solved, the more important were: (1) the minimum temperature at which the sodium chlorid solution (3 per cent.) could give the proper results; (2) how to keep the blood out of the vessels during its introduction, and (3) how to prevent embolism. Each of these problems has been met successfully from the first, except the temperature, and this had to be tried on the patient. He therefore used the solution at the boiling point in his first operation. The result was not ideal because there was extensive sloughing of the surrounding tissues, but no ill effects otherwise. This showed that he could introduce solutions hot enough to produce the desired result. In the next two cases a temperature of 185 degrees was used, which was still too hot, as a small amount of sloughing occurred at one point. Since then he has employed it at 160 with perfect results. He describes his technic, in full, with all precautions used, the detailing of which does not lend itself readily to brief abstracting. The advantages claimed for it are as follows: "1. The operation requires only a few minutes; hence a short anesthesia. 2. It is less tedious. 3. It is as easily accomplished in the presence of a large amount of panniculus adiposus as in its absence. 4. It involves a minimum amount of cutting. 5. It is cosmetically ideal. 6. The nerves are left intact; there is no dead sensation. 7. The lymphatics are preserved. 8. There is absolutely no pain after the operation. 9. The length of stay in the hospital is reduced to a few days."

Biologic Principles in Surgery. J. S. Horsley, *Journal American Medical Association*, May 3, 1919.

Horsley says that it cannot be too often emphasized that surgery should be more of a science than an art. Skilful operation is merely good artisanship, but the application of scientific principles may make a bungling operator more of a success than the merely skilful one. The ideal surgeon should be thoroughly imbued with the scientific principles of his work and not be merely mechanically skilful. He gives instances of the physiologic principles that should be kept in mind, such as the importance of healthy blood in the cure of tuberculous peritonitis and in the treatment of slow or threatened gangrene, and mentions that the surgery of the gastro-intestinal tract, in operations such as gastro-enterostomy, still suffers from our lack of acquaintance with the actual biologic principles involved. The work of Cannon and Murphy in their studies of peristalsis has not received proper attention. A common and interesting problem in surgery is that of drainage. The mechanical measures that are followed by good results would seem ridiculous were there no biologic principles involved. The whole method of drainage really depends on the reversal of circulation in the local lymphatics, and is chiefly a biologic process—Nature's efforts to exclude a foreign substance. There are many problems in neurologic surgery that require knowledge of physiology to be settled satisfactorily, and Horsley refers to a physiologic extirpation of the gasserian ganglion as demonstrated by Spiller and Frazier as an instance. He also states that the fashion for plating fractures, which had no reason for its existence except that it was a mechanical method, is going out of use; its rejection, owing to the recognized bad effects of inclosed foreign bodies, he regards as fortunate. The emotions are mentioned also as having an effect bearing on surgery, and transplantation of organs and skin-grafting as dependent on biologic laws and their recognition. Real progress in surgery lies not so much in cultivating the art as in recognizing its dependence on biologic facts and their application to every proposed operation.

Note Sur l'Efficacité des Injections Hypodermiques de Sérum Polyvalent de Leclainche et Vallee Dans Quelques Affections Septiques Locales. (A Note on the Treatment of Some Local Infections with the polyvalent serum of Leclainche and Vallée.) Antoine Basset: *Revue de Chirurgie*, May-June 1918.

Basset has seen very good results follow the use of this serum in 16 cases distributed as follows: 9 cases of acute lymphangitis with adenitis; 1 case in an amputation stump; 4 cases of furunculosis; 1 case of multiple wounds recently treated by regularization, excision and primary suture; 1 case of phelbitis after appendicectomy.

Influenza Alopecia. M. J. Morrissey, *Journal of Cutaneous Diseases*, March, 1919.

Attention is called to the great frequency with which alopecia diffusa has followed influenza infection in the present epidemic. It occurred in Morrissey's cases as early as two weeks after the subsidence of the fever and as late as four to six weeks. It is not determined whether the condition is due to the influenza toxin per se, or to it in combination with a preexisting seborrhoea.

Isohemagglutination Groups. N. W. Lyon, *Journal American Medical Association*, April 19, 1919.

There are two systems of designating the four different isohemagglutination groups in use. Few authors refer to the two systems, and the author of the older one is seldom mentioned. The older recognized classification is that of Jansky, according to which the most common group, the one whose serum is most agglutinated, and the cells of which are never agglutinated, is call Group I, while the least common group, the serum of which never agglutinates, while the corpuscles are always agglutinated except by its own serum, is called Group IV. Groups II and III are intermediate in these qualities. The other system is that of Moss, which is just the reverse of that of Jansky. The common or strong group is Group IV and the rare group is Group I. In favor of the Jansky method are its priority and the rational method of numbering the groups according to the frequency of their occurrence. The argument for the Moss classification is its apparently wider adoption.

Painless Incision. A. L. Soresi, *Journal American Medical Association*, May 13, 1919.

Soresi says that incision may be made painless by first dipping the scalpel into pure carbolic acid a few seconds before use. This will be the case even in incising deep tissues. It is the least dangerous method of anesthesia, either local or general. Naturally it is the cheapest method, and in a certain class of cases it promotes the complete cure of the pathologic condition. This statement requires some explanation. On account of the slight cauterization produced, wounds do not close as rapidly as when made with a bare instrument, but this is an advantage in incising tissues the cut edges of which do not need to adhere immediately, as in opening pus-collections or infected tissues, but it should not be used when union by first intention and suture are needed. The scars produced by this method are not ugly; in fact, much less so than those resulting when drainage is required.

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ORTHOPEDIC TREATMENTS IN NEUROLOGICAL CASES.*

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There are no two other specialties so interlinked as those of neurology and orthopedics. Excluding the purely orthopedic cases (as diseases of bones, infectious arthritis, flat feet, rickets, etc.) and excluding the mental diseases, there is a great group of cases that is usually treated by either of the two specialists or when treated by one, requires also the assistance of the other It is for the benefit of every orthopedic surgeon to have a fair neurological training. Of course, he may omit the mental diseases. Similarly every neurologist should have a fair knokledge of the principles of orthopedics. This point is not yet well emphasized and we still find in our orthopedic text-books very short chapters on neurological diseases, and vice versa. Many orthopedic hospitals have no neurologist on their regular staff and the neurological hospitals send for an orthopedic surgeon only when they have to put on a corset for a fractured spine.

Almost every orthopedic surgeon can cite scores of cases brought to him on account of inability to walk dating from birth or developed at a later age, and the examination revealed to him a purely neurological condition. Even general medical men will send a case to the orthopedic surgeon to ask for some advice to check the disabilities and the discomfort following the ailment, though they know that the disease is purely neurological and incurable.

Another example of the necessity of cooperation is found in the physical remedies, *e. g.*, thermotherapy, massage, hydrotherapy, re-education, etc., ordered by the neurological department, but the details of their application are better known to the orthopedic surgeon.

The electrical treatments are mentioned in the orthopedic text-books but are more scientifically applied in the hands of the neurologists.

We orthopedic surgeons feel that it is our duty to bring before the neurologists the great help we can offer to their specialty in helping in their treatment of many of the deformities and disturbed muscular balances that come under their care. It is also desirable that orthopedic surgeons take a deeper interest in neurology and further extend their scientific investigations to that fertile field as this will advance the specialty in which we are all interested.

This paper is based largely on work carried on for the last ten years at the Montefiore Home and Hospital and for the last five years at the Fordham Hospital, New York. In the former institution, the investigations were conducted by Dr. G. R. Elliott (the attending Orthopedic Surgeon) and myself, the cases being referred from our extensive neurological service by the neurologists, particularly by Dr. S. Wachsmann and Dr. Isidor Abrahamson. At the latter institution the work was cooperatively carried on by the neurological surgeon, Dr. A. S. Taylor and the neurologist, Dr. J. Byrne, and myself. The results of some of the investigations are already published, some are in preparation, and much is still incomplete. In both institutions we have obtained results that would have been impossible had there not been this close cooperation of neurology, neurological surgery and orthopedic surgery

I hope, therefore, that this short paper will serve as a plea for and a stimulus to further investigation.

Before proceeding with detailed discussions of the diseases, a few facts common to both specialties and of great interest in a paper of this kind ought to be stated and elucidated.

MUSCULAR ACTIVITY OR TONICITY

According to Barker[2] (in his *"Monographic Medicine"*) muscle tonus is in part a variety of reflex, in part a conscious or sub-conscious innervation for the purpose of maintaining attitude. By it is understood to be an ever continuous feeble state of contraction in which the voluntary muscles are maintained during life.

This tonus appears to be maintained largely by afferent stimuli coming from the muscles, tendons, fascia and periosteum to the spinal cord where the impulses are transferred to the lower motor neurons, stimulation of which contracts the muscles concerned. The intensity of the tonic innervation is dependent not only upon the innervation in the lower reflex arcs, but also upon favoring and inhibiting influences arriving from higher neuron systems within the spinal cord and brain. The tonus is, therefore, increased in certain muscles where the pyramidal tract is injured.

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*Read before the Montefiore Clinical Society, April 11, 1919.

Barker[2] further adds: "Recently a strong reaction against prevalent conceptions of muscle tonus has set in. It is maintained (1) that there is no such thing as a general "contraction" of muscles when at rest. (2) That which has been called tonus is a coordinative performance that calls forth a certain attitude by means of finely graded contractions. This new doctrine avoids the term 'tonus'."

In following the two excellent books by Colin McKenzie,[19] and Bowen and McKenzie,[4] recently published, one can get a good idea of muscle tonus though the conclusions are quite often contradictory.

In disturbances from the normal tonus there may be: (1) Atony, or hypotony when the tonus is absent or markedly diminished, and this is met in tabes dorsalis (due to loss of the sensory limb of the reflex arc), in flaccid paralysis as anterior poliomyelitis (due to the lesion of the motor limb of the reflex arc) and dengenerative arthritis, (due to relaxation of ligaments and changes in the muscles).

(2) The converse of the above condition is hypertony or abnormal muscular rigidity, met in the congenital spastic paraplegia, multiple sclerosis, Friedrich's ataxa or the muscular rigidity found in affections of the pyramidal tract, tumor of the cord, or in all acute joint lesions (?). It will be worth while to bear in mind that Parkinson's disease or paralysis agitans produces a peculiar hypertony of unknown origin and that rigidity is often a more marked feature than the tremor of the disease and this is responsible for the clumsiness of the movements and for mask-like rigidity of the face. We observed at Montefiore Hospital that the general appearance of the face in paralysis agitans and in chronic infection or proliferative arthritis shows marked similarity (Figs. 1-6). Spiller,[20] favoring the toxic theory for paralysis agitans, really finds a strong resemblance between paralysis agitans and some forms of what was known as rheumatoid arthritis.

(3) Another manifestation of abnormal muscle tonus is that met with in myotonia congenita (Thomson's disease) in which the patient, on attempting to perform a movement, is often unable to do so on account of a suddenly appearing hypertony in the muscles concerned.

(4) The reverse of this disease is amyotonia congenita, met in small children. It is a condition of extreme flaccidity and atony of the muscles, especially of the lower extremities. (Fig. 12.) Here the hypotony, as in progressive muscular atrophy, seems to be due to a primary "motor" anomaly, not to injury of the sensory limb of the arc as in tabes.

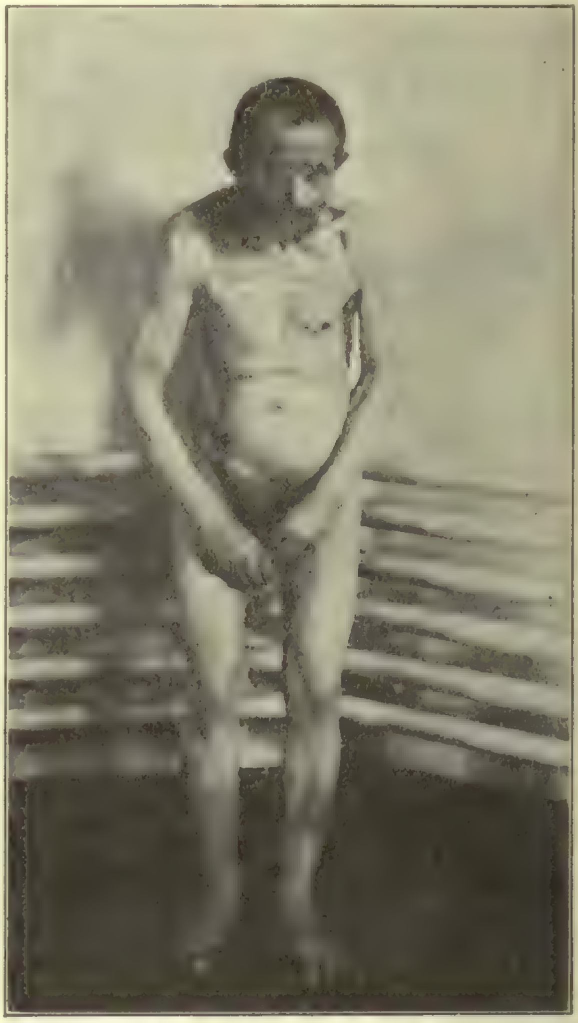

Fig. 1—A case of paralysis agitans. Note the facial expression and the kyphotic position. (Montefiore Home and Hospital.)

(5) Dystonia musculorum deformans or tortipelvis is a peculiar condition only recently described. In this there is a marked hypertony with spasm affecting certain groups of muscles, especially those of the pelvic girdle, causing the so-called "dromedary gait." (Figs. 13-14.)

Disturbance of Motility of Striped Muscles

Both the orthopedic surgeon and the neurologist examine for the normal motion of the muscles, active and passive, with and without resistance, though the latter frequently calls the electrical apparatus to his aid, while the former never resorts to it. Abnormal motions are manifested either by paresis (or hypokinesis) when there is only a partial inability to perform active movements and in such incidents the neurologist is probably better equipped for the diagnosis, while the orthopedic surgeon is more competent to help restore normal fnuction and particularly to prevent the muscles from being overused.

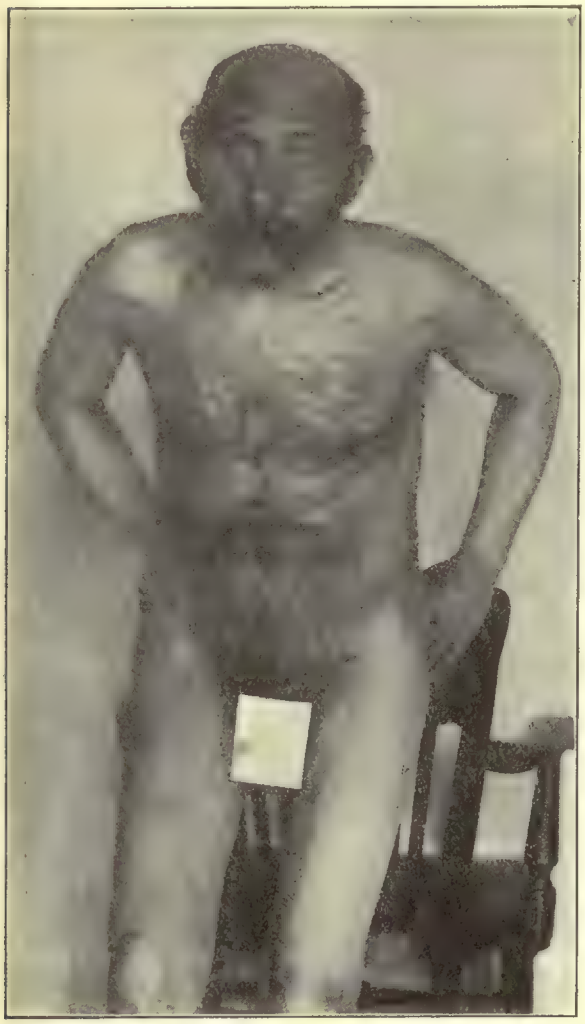

Fig. 2—A case of spondylitis deformans. Compare the facial expression and the kyphotic spine with that of Fig. 1. (Montefiore Home and Hospital).

When there is total inablity to perform active movements it is known as paralysis or akinesis. This group, of course, is well-known and both the flaccid variety, when the tonicity of the muscles is less than normal, as in anterior poliomyelitis, and spastic conditions, when the tonicity is greater than normal, as in spastic paraplegia are treated by the orthopedic surgeon though the neurologist still holds tightly to them.

Under paralysis one must include not only the atrophic, but also the non-atrophic found in dystrophies, etc.

Contrary to the forms thus far discussed, there are cases that present involuntary contractions (or hyperkinesis) due to motor irritation, either through increased physiological stimuli or through pathological stimuli or pathological irritation of the motor neuron system. The orthopedic surgeon meets very often muscular spasm that is really pathological permanent contraction arising reflexly through purely quantitative increase of physiological stimuli.

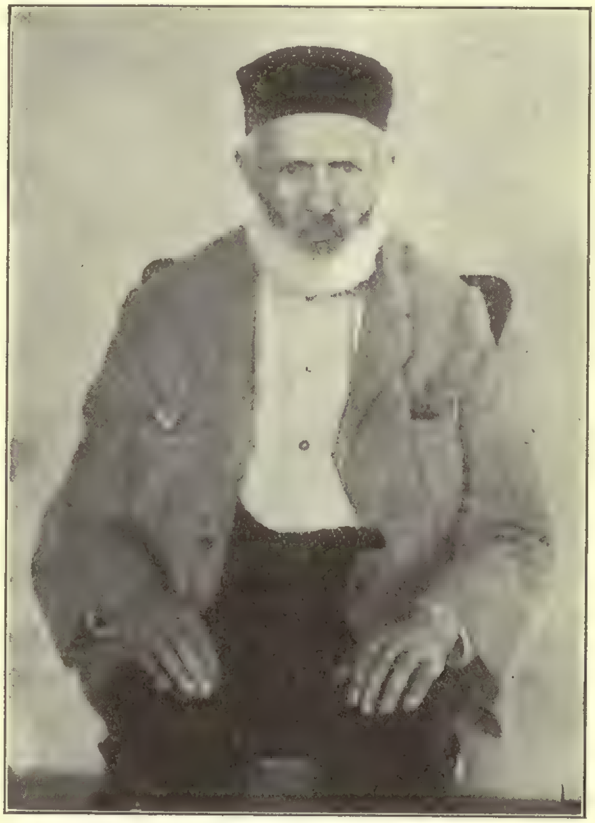

Fig. 3—Facial expression of a patient with paralysis agitans. (Montefiore Home and Hospital.)

We shall skip over the tremors, tics, athetosis, and dwell shortly on three forms of hyperkinesis. (1) Synkinesias or associated movements, *i. e.* on moving one limb the other may move, hence in hemiplegics the good hand will close while attempting to close the paralyzed one. This phenomenon was utilized by us in giving exercises to hemiplegics by ordering them to move both sides simultaneously.

(2) Continuous contraction as a response to stimuli known as "tonic" should receive orthopedic attention, as this state responds rapidly to the application of plaster casts and braces.

(3) When the contraction is rhythmical or intermittent, it is called "clonic."

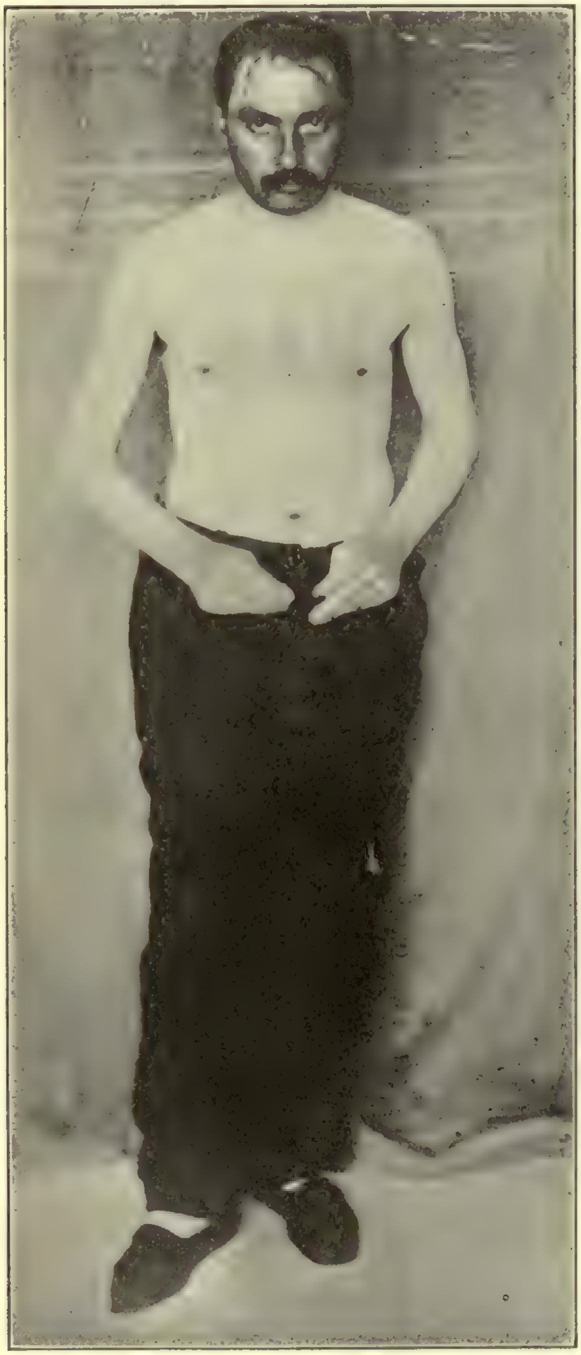

Fig. 4—Patient with parlysis agitans. (Montefiore Home and Hospital.)

Under this head of hyperkinesis come also the occupation cramps, as writers' cramps, piano players' cramps, etc.

Another phenomenon of disturbance of motility is that of co-ordination varieties of which can all be grouped under one heading, "ataxia." (The neurologists differentiate between peripheral and spinal, vestibular, cerebellar and cerebral ataxias. The orthopedic surgeon usually sees only the Spinal form, but he must consult the neurologist as to whether or not it is one of the other forms.)

The Gait

I do not think it is necessary here to review in detail the normal gait with its three periods: swinging forward, support and shoving the body forward.

The abnormal gaits of interest to us are (a) the paretic, or paralytic, where walking is slow, steps shortened and the legs are dragged. This gait is found in polyneuritis, anterior poliomyelitis, diphtheritic paralysis and muscular atrophies. (b) The spastic gait, in which the patient walks with small leaping steps, knees held stiff, foot in lanter flexion and toes tending to stick to the floor. This gait is found in organic hemiplegia and cerebral diplegia. (c) The ataxic gait, found in tabes and Fredrich's ataxia is well-known.

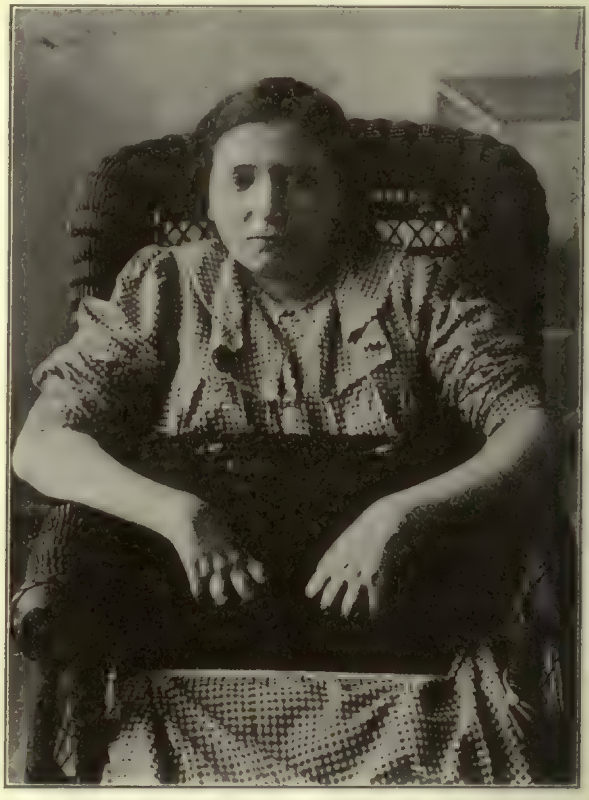

Fig. 5—Patient with infectious polyarthritis. (Montefiore Home and Hospital.)

There are other forms of abnormal gait which, however, are not of interest to us here.

General Outline of Methods of Examination and Treatment in Neurologigal Cases Requiring Orthopedic Care

It is not necessary to review all the steps of examination of neurological or orthropedic cases. I shall only state briefly that in cases that come on the border-line, a combined examination should be made. While the orthopedic surgeon may be able to examine roughly the muscular action, the neurologist can better tell even where only paresis exists. The outline for neuro-muscular examination, suggested by the American College of Surgeons can be advantageously used in such cases.*

A consultation could then be held (as Drs. Taylor, Byrne and myself are accustomed to do) and the course to be taken decided upon. If any operation is to be performed, it should be by both surgeons together, all the after-treatments to be carried out by the orthopedic surgeon. The re-examinations should be by the neurologist and not in the presence of the orthopedic surgeon; thus an unbiased opinion can be given. We found this method of procedure quite advantageous.

As far as treatments are concerned, a few general rules can be laid down while all the details can be discussed later on.

(1) A partially weak muscle should be guarded against stretching and overuse. This will frequently help to restore normal function and also prevent further damage. Rest even in braces and plaster should be carried out for a long time. The value of this rule is seen in the treatment of anterior poliomyelitis, polyneuritis, peripheral nerve surgery, diphtheritic paralysis, myasthenia gravis, etc.

(2) Prevent the deformities. It is more important in the neurological cases, as in purely orthopedic cases, the orthopedic surgeon always guards against it. This should be used more often in cases of dystrophies and myopathies, than it has been used until now.

(3) Braces and plaster should be used freely in all neurological cases though they cause atrophy which the neurologist dreads so much. Many of the disadvantages in incurable diseases can be avoided altogether, or progress of the diseases checked.

(4) The application of plaster must be with greater care than in ordinary orthopedic cases as usually the sensation is diminished and the hypertonicity is usually severe. There may, therefore, more often develop pressure sores which will be resistant to treatment.

(5) Braces, massage and exercises should be used where there is even only slight hope of improvement as the cases in neurology are very rare in which these methods are harmful.

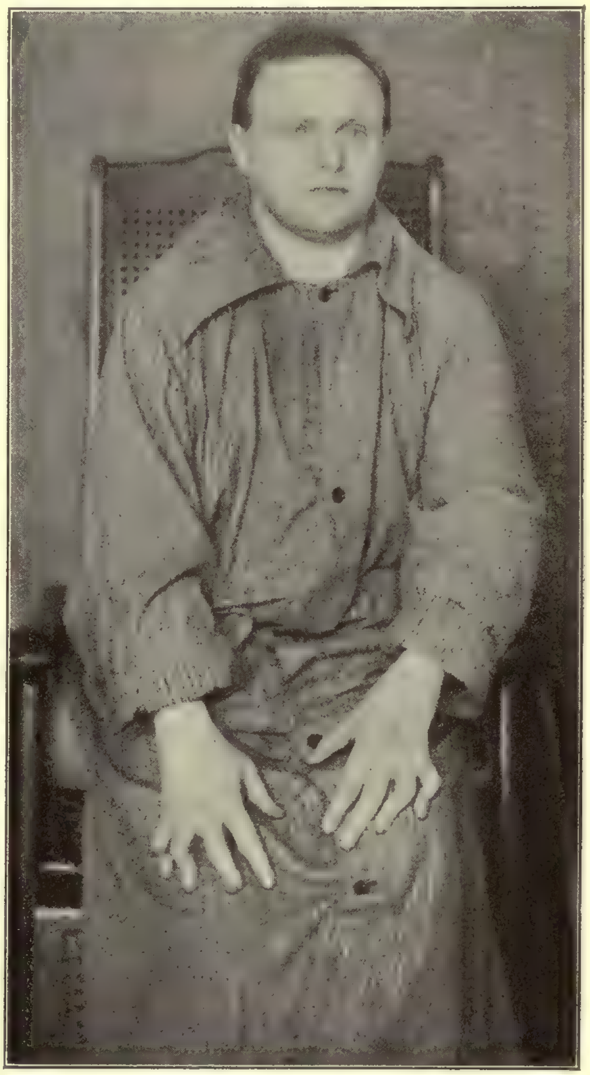

Fig. 6—Patient with infections polyarthritis. Note the similarity of the faces in Figs. 3, 4, 5 and 6.

(6) Hydrotherapy, thermotherapy, phototherapy and heliotherapy are freely employed in such cases, while electrical treatments, except the Bristow coil, appear to be valueless to the orthopedic surgeon.

(7) The use of orthopedic supports in hysterical cases requiring really psycho-analytic methods must be discriminately guarded against as this may increase their attention to the abnormality. Their use, however, is justified in cases where organic

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*The following is taken from the Bulletin of the American College of Surgeons, Vol. IV, No. 1:

Motion: Note gait, paralysis, spasms and tremors, coordination.

Sensation: Note insensibility to pain, touch, heat and cold, muscle sensation; sense of movement, positions, Romberg's sign.

Reflexes: Pupils, normal reflexes, Argyll-Robertson pupil, dilatation, contraction, contraction with irregular outline, tendon reflexes, biceps, triceps, scapulo-humeral, radial, patellar, Achilles, skin and muscle reflexes, epigastric, abdominal, cremasteric, Oppenheim, plantar, Babinski.

Muscles: Atrophy, hypertrophy.

disease existed and the patient has not regained full self-reliance and these will quickly aid them in recovery, *e. g.*, in tabes where a plaster cast on the knees will be of benefit.

I shall now discuss the treatment of special diseases.

I. Treatment of Hemiplegia

The deformities of adult hemiplegia, whether due to embolism, thrombosis or apoplexy are well known, yet how seldom does one try to prevent the development of these disabling deformities. It is taken as a matter of course that they cannot be prevented and once developed cannot be improved. Even the text-books on neurology do not emphasize enough the necessity of avoiding contractions. Some do mention that splints should be applied, but neither is its importance impressed upon the reader, nor are the details of application given. Even such an extensive system as "Modern Treatment of Mental and Nervous Diseases,"[35] does not put much stress on this principle.

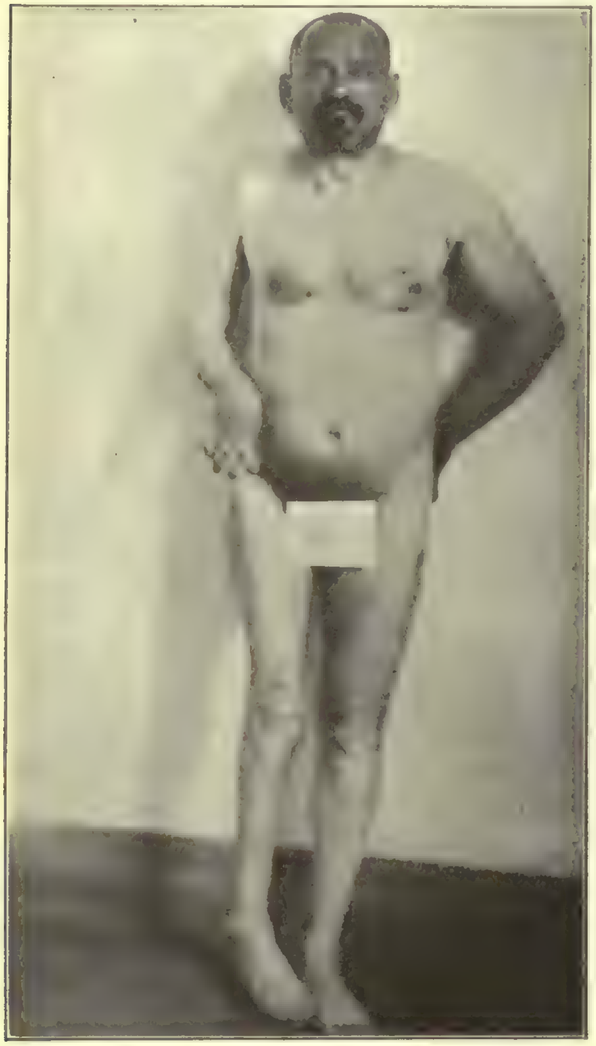

Fig. 7—A patient with hemiplegia of twenty-one years' duration, who after receiving orthopedic treatments was able to walk. Notice the fair musculature of the paralyzed limb, which has increased since being used. The upper extremity in this position without much effort. (Montefiore Home and Hospital).

In the neurological service of Montefiore Home and Hospital, where we always have about sixty to seventy patients with hemiplegia I have not met even one patient who gave a history of having been watched by his attending physician immediately after the apopletic attack for contractures. It is there where my interest was first aroused to these cases. Dr. Elliott and myself found that not only in the early stages can the contractures be remedied but even in old and neglected hemiplegics, great improvement can be obtained. We have there treated a practically bedridden invalid with marked de-

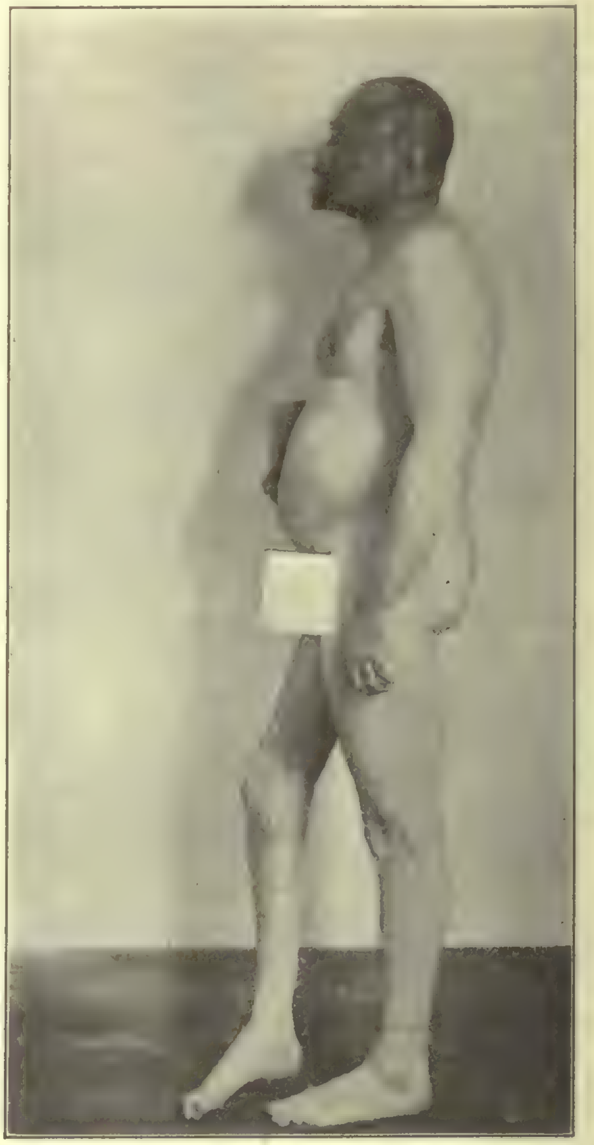

Fig. 8—Same patient as in Fig. 7. Note the excellent position of the feet and the slight flexion of the knee.

formities, *i. e.*, flexion of the thigh on the abdomen, leg on the thigh and the foot in marked talipes equino-varus, of twenty-one years' standing, and succeeded in making him walk. He is able now to walk for a considerable length of time. We reported the case in detail in the *Journal of the American Medical Association.*[12]

That, to our knowledge, was the first case on record of improvement after so long an interval. Franz, Shutz and Wilson,[14] have done similar work on hemiplegics and reported good results.

Since our first case, we have conducted investigations in the early cases of hemiplegia, especially in Fordham Hospital, where patients are frequently brought in by the ambulance immediately after the attack. We have found that the principle used in anterior poliomyelitis can be applied here and all the deformities can be prevented by the application of plaster splints or braces as early as possible, even on the second or third day. In hemiplegia it is still more important to apply the support so early because of the rapid development of hypertonicity of certain muscles. The stretching of the antagonistic muscles is therefore greater than in anterior poliomyelitis. In cases watched by us, we noticed that it was much harder to apply the supports even on the tenth day, due to the marked muscular spasm and hypertonicity, favoring early contractures. Since then we have applied the plaster cast or brace on the second or third day with full gratification.

For the lower extremity, the plaster cast extended to the perineum with the foot at right angle to prevent talipes equino-varus. The knee was put in full extension to guard against contraction, and also against hyperextension. The hand was put in hyperextension at the wrist joint and flexion at the metacarpophalangeal joints. The elbow was kept in straight or semiflexed position as the tonicity of the elbow flexors is great. The casts were changed on the tenth day for removable ones when massage, exercises, etc., were started.

It may be worth while to mention that the famous orthopedic surgeon, Hoffa, distinctly recommended the use of splints in hemiplegic paralysis of the leg, with elastic bands for the deficient flexion of the knee and the dorsal flexion of the foot.

In all the early cases that came under our observation we were successful in preventing the occurrence of the deformities and obtained very early return of function. It is really remarkable to note the great benefit we can obtain by these simple methods that all of us are using in anterior poliomyelitis but are very seldom called for to help the hemiplegics. In the old and neglected hemiplegics the deformities are of course corrected.

In administering massage, we made use of the experiments and conclusions of Oden,[23] applying effleurage for the contracted or spastic muscles, while for relaxed and atrophied muscles petrissage and tapotement were resorted to.* In early cases we began massage in the third week, though Bucholz urges earlier massage.

Regarding the time to commence exercises in early cases, there is a variey of opinion. H. Oppenheim[24] discourages early movements, waiting six weeks. Others begin earlier. In reality no specified time can be given, each case being considered individually in relation to its sensitiveness, the amount and character of the contractures. We have started exercises on the third week with encouraging results.

Regarding the forms of exercises, we made use of the priciple of synkenesis and performed symmetrical exercises, *i. e.*, the good limb performed at the same time the same motions as expected of the bad limb. It may be advisable to perform these exercises in front of a mirror. We began with five to ten minutes daily and increased to fifteen minutes twice a day. (By consulting Frenkel's book on tabetic taxia, one gets a proper understanding how to teach these patients the proper way of walking, sitting down and getting up.) In the old cases Zander's machines are fully resorted to.

Electrical treatment is still used by some. In our opinion it is of very little benefit and perhaps even harmful, as it will increase the tonicity.

At Fordham Hospital, Drs. Taylor, Byrne and myself have performed early surgical operation in the skull, *i. e.*, decompression and evacuation of the clot, (Hudson operation). This was done even on the second day after the attack and without an anesthetic. The results were extremely gratifying. We demonstrated some of our cases before the New York Neurological Society and gave all the details of the method (the paper has been submitted for publication).

Of course, in infantile hemiplegia one may expect better results if treated early. I am not taking in consideration the mental defficiency of these cases, which materially retards the improvement.

If the cases come to us with the deformities already present, they can be treated under the same principles as those occurring in anterior poliomyelitis or spastic paraplegia.

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*I am using the terms advocated by Bucholz in his book "Therapeutic Exercises and Massage," and not the terms advocated by Oden.

(Speech disturbance in right sided hemiplegia should be treated by the modern methods of speech re-education.)

II. TREATMENT OF ANTERIOR POLIOMYELITIS

The success of orthopedic treatments in anterior poliomyelitis is so well established that I do not have to mention at all what can be and is done for them. All the principles used in anterior poliomyelitis can be applied to polyneuritis and diphtheritic paralysis. A good review of all the details of treatment can be found in Lovett's book[18] or that of Ruhräh and Mayer.[25]

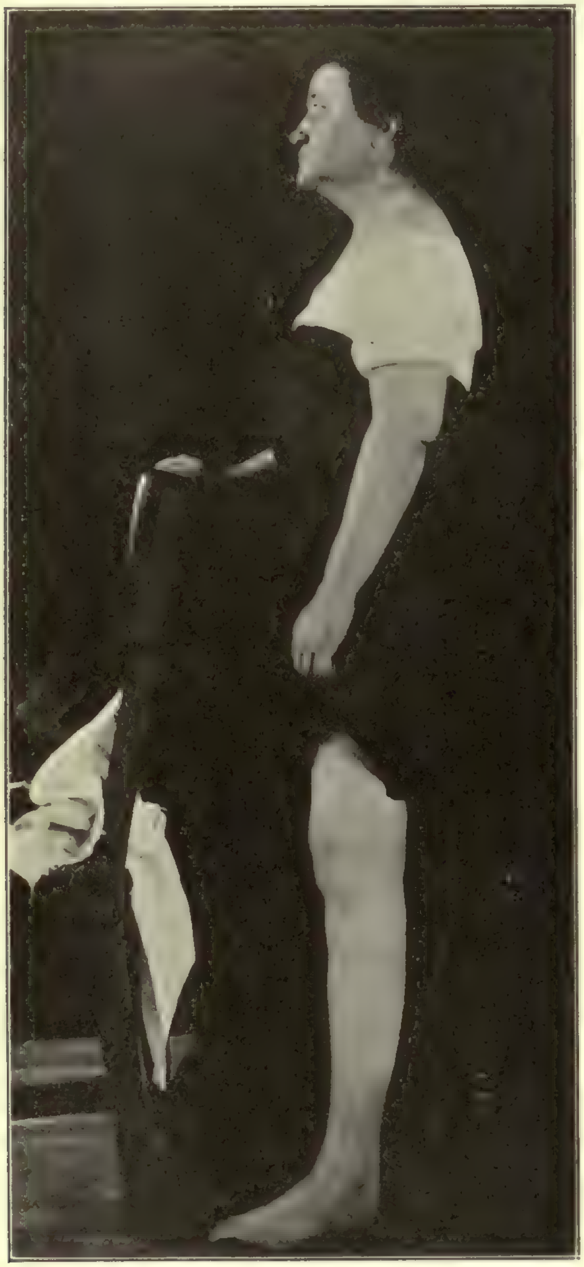

Fig. 9—A patient who had hemiplegia for one and a half years and developed contractures of hand and knee. After a decompression and evacuation of a cyst (Hudson operation) followed by orthopedic treatments, she made a rapid recovery. Note the good position of the limbs.

III. TREATMENT OF SPASTIC PARAPLEGIA AND ORGANIC LESIONS OF THE SPINAL CORD.

In an excellent paper by Drs. Blahd and Stern at the last meeting of the Orthopedic Section of the American Medical Association, all the various methods of orthopedic treatments in cerebral spastic paraplegia were so ably stated that I cannot do more justice than refer the reader to that article.[5] They have shown distinctly that if there is any hope, the orthopedic surgeon is the one to be the principal guide.*

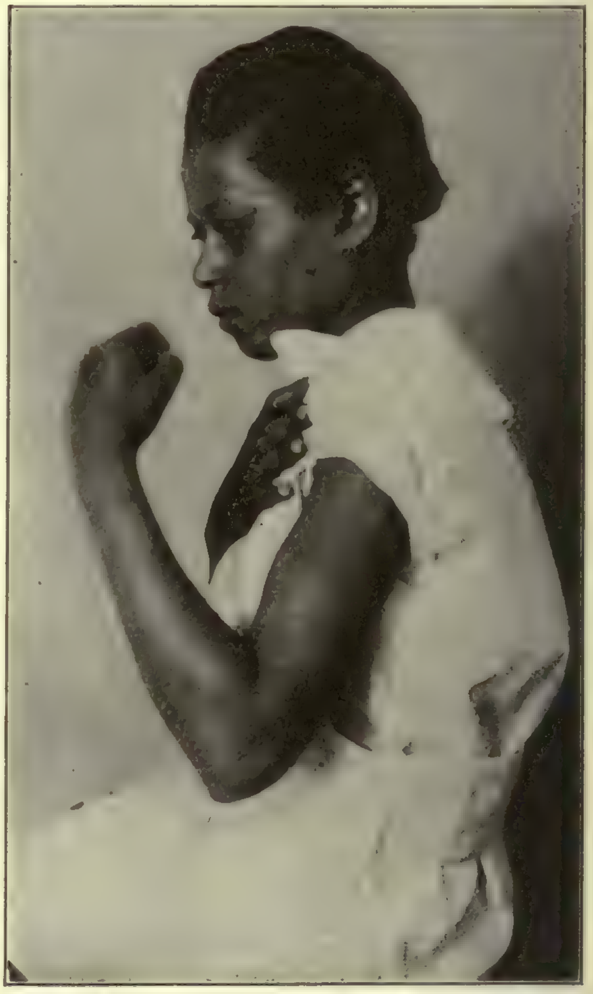

Fig. 10—A patient with hemiplegia treated by decompression and evacuation of clot (Hudson operation) and orthopedic treatments showing the good musculature and absence of contractures.

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*In a brief outline they give the following courses of operative procedures:

1. Muscle and Tendon Operations:
    (a) Forcible redressment and overcorrection.
    (b) Tenotomy.
        1. Subcutaneous.
        2. Open.
    (c) Tendon lengthening.
        (1) Subcutaneous.
        (2) Open.
    (d) Muscle resection.
    (e) Tendon transplantation.

Whatever applies to cerebral spastic paraplegias applies largely to organic lesions of the cord producing spasticity of the limbs, such as tumor of the cord.

In this connection we can mention also tabes dorsalis. Though the disease is incurable, it has been shown that application of braces or plaster casts to the knees makes the patient feel so much more certain that the gait is improved and the occurrence of fractures is prevented. One must remember that the tabetic is uncertain of the position of his limbs and is therefore afraid to walk and the brace gives him security. It is hard, however, to influence a tabetic to wear a plaster cast.

Where Charcot's joints are present, only apparatus has to be resorted to. For exercises one can use Frenkel's or Maloney's system.

For multiple sclerosis, which is another organic spinal disease, very little can be done; however, slight benefit is obtained by light massage and the re-educational exercises of Frenkel.

Pressure paralysis due to Pott's disease is always treated by orthopedic methods.

IV. TREATMENT OF BIRTH PALSIES.

Birth palsies or what is commonly known as Erb's palsy has only lately been referred to the orthopedic surgeon, due to the excellent work and advocacy of Sever.[31] Unfortunately, the cases are referred to us late, when the deformities are marked and the atrophy of the muscles due to disuse and overstretching is intense. If we could get the cases early, say at the first or second week and treat them as we treat anterior poliomyelitic cases with supports to guard against further injury and stretching, one can expect very good results. In my series of cases of Erb's palsy treated in the last two years, five patients were brought to me at the early age of a few weeks. (One of them was bilateral.) They have been treated with a plaster cast to hold the arm in an abducted, elevated and outwardly rotated position with the hand supinated. This support was maintained between massage and exercises. No electricity was used. One patient made a complete recovery in six months. The other with the bilaterial palsy had one hand completely cured in two months while the other hand was cured after six months. The third child who came at the age of three months has not shown sufficient improvement after two months' treatments and was then operated on by Dr. Taylor and myself—an operation on the plexus and a Sever operation on the contracted muscles. The result was very gratifying. The other two children are still under treatment and are improving rapidly. (I expect to publish soon my series of cases of Erb's palsy).

I believe that in this class of cases the co-operation of the neurologist, neurological surgeon and orthopedic surgeon is very clear. The neurologist is best qualified to determine the injury and its location; then either plaster is applied or an operation can be resorted to. He can also give the correct interpretation of the improvements.

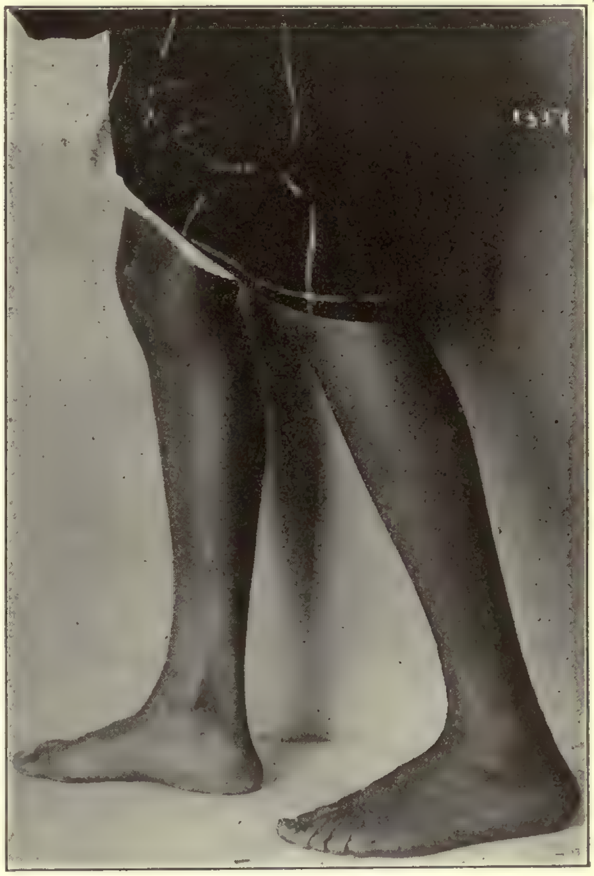

Fig. 11—Same patient as in Fig. 10, showing the proper dorsal flexion and absence of contractures.

V. TREATMENT OF PERIPHERAL NERVE INJURIES.

During this war, it became a practice to call on the orthopedic surgeon for help in these cases to apply a brace or plaster before the nerve operation and keeping it up for a long time afterwards to guard against overuse of the denervated muscles and also against overstretching. Mayer[22] gives

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(f) Muscle implantation.
2. Brain Operations:
  (a) Trephining and evacuation of blood clots.
  (b) Decompression.
  (c) Excision or evacuation of cysts or tumors.
3. Motor Nerve Operations:
  (a) The causation of temporary paralysis by means of various injections (Allison's method).
  (b) The partial resection of the motor nerves leading to the spastic muscles (Stoffel's operation).
4. Centripetal (Sensory) Nerve Operations:
  (a) Resection of the posterior nerve roots (Foerster's operation).

careful details of the combined method. Stookey[27] has also emphasized this part of the treatment to peripheral nerve injuries. It is useless to bring before you the difference between this combined method and that previously used, when the nerves were sutured and the after-treatments left to nature or ignorant masseurs.

Volkman's ischaemic paralysis is best treated by orthopedic methods and the result obtained by Jones' method is well-known and needs no repetition[34] and [40].

Those conditions diagnosed until now as sciatica are of course mainly conditions arising in the sacro-iliac joints and many of these incurable patients have been relieved as if by magic by the simple application of a sacral compressor.

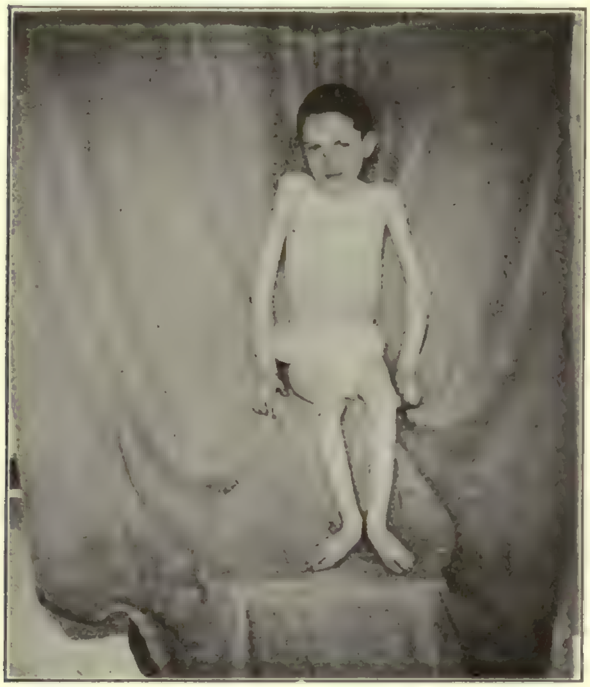


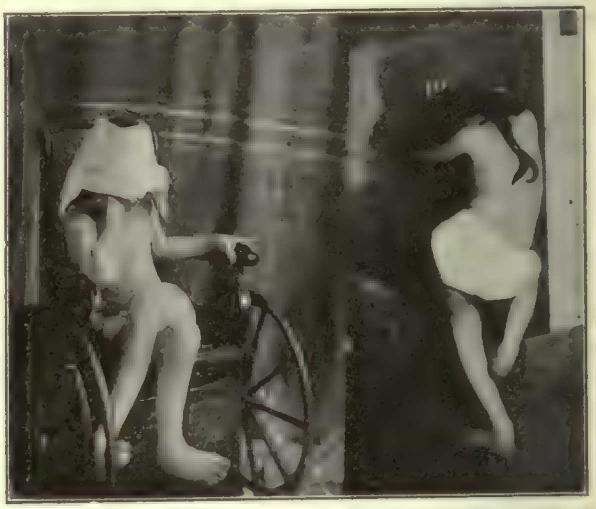
Fig. 12—A case of amyatonia congenita. The child is eleven years old, never walked. From sitting, the feet, knees and hips became contracted in the position seen in the photograph. (Montefiore Home and Hospital).

Many of the pressure symptoms due to an enlarged transverse process of the last lumbar vertebra have been cleared up by the removal of the offending transverse process.

VI. Treatment of the Myopathies, *i.e.* Muscular Atrophies, Dystrophies and Dystonias.

Abrahamson[1] gives careful details of the orthopedic treatments in these incurable conditions. He based his conclusions mainly on results obtained in the Montefiore Home and Hospital, where we have a great variety of these cases. To quote Abrahamson in short about primary myopathy: "Those who are confined early to chairs do far worse than those in whom locomotion is possible. Where a weakness of the spinal muscles incapacitates the patient, proper braces or support are important and these will do much to arrest the spread of the disease. Massage and passive movements are important. Overexertion must be carefully guarded against. Where contractures exist, tenotomies can be used. Tendoplasty and tendon transplantation are of little value. Shortening of tendons is rarely of service. Use splints to prevent contractures. Nerve transplantation is useless." It is needless to remind you that very seldom is the orthopedic surgeon consulted. The neurologists are still forgetting these principles and these patients are allowed to become worse.

Progressive muscular atrophy gives very flail joints which should be guarded against by braces, etc. Abrahamson states: "A skilled orthopedic surgeon is able to overcome many of the disabilities and render possible a considerable amount of exercises by the patient himself."



Figs. 13, 14—A case of dystonia musculorum deformans. Note the marked contractions. (Montefiore Home and Hospital.)

About the dystonias we had not enough experience as yet to say whether they will improve or not.

Conclusions

1. Orthopedic surgery is a great aid to neurology and vice versa, if proper coordination between the two specialties is used.

2. In all cases that come on the borderline, a combined examination should be made and the course to be taken decided upon. The operation, if any, should be done by the orthopedic and neurological surgeons, the after-treatments are carried out by the orthopedic surgeon and the re-examinations by the neurologist.

3. Almost all neurological diseases lead to deformities and these should be guarded against. The orthopedic treatments will not only save many disabilities, primary or secondary, but also hasten a cure, if such is possible, and check the disease.

4. The principles of braces or plaster employed in anterior poliomyelitis can in general be used in hemiplegia, polyneuritis, peripheral nerve injuries, Erb's palsy and the myopathies.

5. Braces, massage and exercises should be used where there is even only a slight hope of improvement, as those cases are very rare in neurology when these methods are harmful. These, however, must be used intelligently. They should be used very cautiously in hysterical and functional cases.

6. Birth palsies, peripheral nerve injuries and hemiplegia should receive early orthopedic treatments and the bad deformities will not occur.

7. In the myopathies, the application of braces will prevent the occurrence of these distressing deformities and prevent the stretching of some muscles, which is a great factor in the deficient function. It also prevents overuse of the weakened muscles.

8. Re-education of muscular action is the most useful part in proper treatments of the neuro-muscular diseases.

I wish to express my sincerest thanks to Dr. Wachsmann, the Medical Director of Montefiore Home and Hospital for permission to make free use of the material at the Home, and to Drs. Taylor, Byrne and Elliott for co-operation in carrying out some of the observations made in connection with this work.

529 Courtland Avenue.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JULY, 1919

SALUTATORY.

With this issue of the Journal the editor resumes his duties after a lapse of eighteen months occasioned by military service. This break, though a long one, was the first in the service he has endeavored to give to the readers of the American Journal of Surgery since its initial appearance in April, 1905. In the continuance of that service he hopes to bring to bear whatever broadened outlook a first hand experience with the activities and emotions of war and with war surgery—at the front and in a large base hospital—has given to so much of the art and the science of surgery, as he may have learned in the years of his civilian practice.

The editor wishes to express his grateful appreciation of the loyal services of the various members of the Journal staff in carrying on its work in his absence. Especially he and our readers are under obligation to Dr. Ira S. Wile who, in addition to the conduct of his own department, "Surgical Sociology," so well filled the post of editor-in-chief. Dr. Wile is not a surgeon but he is an experienced medical journalist, and a medical sociologist of national repute; and he has been in touch with surgical literature and with the activities of the Journal through the unique department therein which he established nearly ten years ago. That valued feature of the Journal—the accomplishments of which Dr. Wile modestly summarized in the last issue—will continue under his guidance. While he is quite able and willing to supply all the material needed to fill as much space as we can usually spare for "Surgical Sociology," we have no desire to make that department exclusively editorial. Its columns are open for contributions and discussions, which, indeed, it is part of its purpose to encourage.

The engagement of so large a percentage of the profession in the military service has caused, in the last two years, a great shrinkage in the number of articles contributed to medical journals. With the return of these men—and women—to civilian practice and the lessening of the burden that fell, in their absence, upon the others, contributions will presumably soon regain ante-bellum proportions, and we have no doubt that the American Journal of Surgery will be favored again as abundantly as before. The editor has heretofore rejected a large percentage of the articles submitted as falling below the standard he has adopted for his readers and, in their interest, he hopes to continue this beneficent practice. The Journal aims to be a "magazine of practical surgery in all its branches" but it seeks also to be representative of the best in the progress of clinical surgery and surgical therapy.

War conditions have hampered much the department of abstracts, not only in respect of foreign journals but also, in no small measure, of American publications. These difficulties will gradually disappear with the return of peace. In addition we are putting in operation a plan that will, we believe, greatly improve this department, so that it will furnish each month a résumé of recent surgical articles of importance or of clinical interest gleaned from the various medical journals of this and other countries.

In resuming the literary cares and responsibilities of the Journal the editor bespeaks a continuance of the indulgence with which its readers have for so many years borne with him.—W. M. B.

WOUND DIPHTHERIA. DIPHTHEROIDS.

For some years we have been interested in noting the behavior of wounds that became infected by diphtheria. Reporting our observations in three cases, S. K. Levy published two years ago (American Journal of Surgery, August, 1917) a summary of the entire subject. In that article, and in an editorial in the same issue, were emphasized the following clinical deductions, suggested chiefly by our own experience: The manifestations of wound diphtheria are neither constant nor characteristic; a grayish or whitish membrane is not always present; any discoloration or membrane, an otherwise unexplainable necrosis, even only an unusual odor, appearing in a wound, should arouse a suspicion of the possibility of infection by b. diphtheriæ; the patient may be overwhelmed by accumulating toxins before the changes in a previously normal-appearing wound are accounted for or, sometimes, even before these changes attract serious attention. In one of our cases the yellow membrane disappeared, the entire wound becoming gangrenous and distinctly green, the gangrene extending as a black area in the adjacent skin.

These observations were in children. It was interesting to note that in adults wound diphtheria may also present variations from the membrane type. In a base hospital, at a time when there were sporadic cases of nasal and pharyngeal diphtheria, we noted the occasional development on previously clean, granulating wounds of soldiers, of characteristic diphtheric membranes. In addition to these, however, there were two cases of what we believe were true infections by Klebs-Loeffler bacilli, in which no membrane whatever appeared. Previously clean, actively granulating wounds, ceased to contract; the granulations "melted away," exposing the underlying muscles, which, in one case, showed here and there minute *green* areas of necrosis; the temperature was elevated for a few days; a narrow zone of redness and swelling appeared in the surrounding skin; then the inflammatory reaction subsided and the wound slowly contracted, without granulating, the organisms persisting in the wound —despite all antiseptic treatment—until it was completely cicatrized!

While in children the infection of a wound by diphtheria is often quickly fatal, the soldiers whom we have seen with the same wound infection were at no time alarmingly sick, even though the membrane was over a large, granulating thigh stump.

At the base hospital where these cases were seen a considerable number of wounds was found to contain organisms morphologically and culturally identical with the Klebs-Loeffler bacillus. Some of these wounds were examined for diphtheria because they presented suspicious changes of one kind or another; some merely because they were ward "contacts." Not a few of the wounds in which the organism was found showed no variation from the appearance of normal granulations; some exhibited a translucent colorless or grayish film; in some the granulations had changed somewhat in color or size and the healing process had become sluggish. Toxin tests from the bacilli in one of these wounds proved negative; and we are prepared to believe that in most of these cases the bacteria found were only *diphtheroids.*

Reporting "An Outbreak of Diphtheric Wound Infection among Returning Soldiers" (*Journal of the Am. Med. Assn.,* September 8, 1917) Fitzgerald and Robertson, of the Canadian Army Medical Corps, record that between May 20th and June 7th, 1917, among sixty-seven men with suppurating wounds, from which cultures were made, "thirty-two were found to be suffering from b. diphtheriæ infection"!

Adami and co-workers in a study of "Diphtheria and Diphtheroid Bacilli in Open Wounds," (*Canadian Medical Association Journal,* September, 1918) express the opinion that most of the cases recorded by Fitzgerald and Robertson were instances, not of diphtheria, but of wound contamination by diphtheroids. They demonstrated that diphtheroids have not only the same morphologic but may also exhibit the same cultural peculiarities as the Klebs-Loeffler bacillus; and that the only decisive differentiation is by test of toxin production.

Recently Hartsell and Morris, of the U. S. Army Medical Corps, made "A Report of Sixty Cases of Wound Diphtheria" in a base hospital (*Journal of the Am. Med. Assn.,* May 10, 1919). These were findings in routine wound cultures! The authors state that in no case was there any systemic symptom; twelve per cent. showed a gray membrane; "about one-half showed only a faint grayish discoloration of the granulating surfaces which under ordinary conditions would have passed unnoticed; about 6 per cent. looked absolutely healthy." As in the Canadian report, only one culture was tested for virulence. It proved toxic, as it did in the single instance from the series of Fitzgerald and Robertson; but both sets of authors failed to state whether the test was made from the culture of a wound clinically diphtheric or from one of the wounds examined as a routine.

The conclusion seems inescapable that most of the cases recorded by Hartsell and Morris were also instances, not of wound diphtheria, but of infection by diphtheroids.

While these two reports have the merit of drawing attention to diphtheric wound infection, it is to be regretted that they put on record a much higher incidence of such infections in war wounds than has actually existed. It is unfortunate, too, that they so confuse the clinical notion of wound diphtheria for, as we have pointed out, this does occur quite atypically. These publications may lead, on the one hand, to the unnecessary isolation of some cases and, on the other hand, to the more serious mistake of dismissing as a "diphtheroid infection" a case of true wound diphtheria without a characteristic membrane.

The diphtheroids are regarded as non-pathogenic. Some of them, however, appear to interfere with normal wound healing. Further observations may even demonstrate that certain varieties are pathogenic.—W. M. B.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

BLINDNESS.

The advances made in the protection of workers from accidents tending to injure eyesight were emphasized during the period of speeding up attendant upon war. In fact, the entire movement for the conservation of vision has progressed very rapidly during the past five years. Fortunately, war itself has been responsible for only a small number of men lacking in both eyes, and the number deprived of one visual organ was not large among the Americans. A certain meed of pity is extended to those who have suffered damage to vision in the demonstration of their patriotism, but their loss is no more depressing to them or more damaging to society than similar conditions existent among the countless other persons robbed of eyesight through accident or disease.

Fortunately, the attitude towards the blind has undergone many alterations. The blind man is not to be regarded as an object of pity, merely deserving a pittance or a charitable contribution. He is to be recognized as a man capable of fulfilling his destiny, despite a handicap. He is to be given an opportunity to develop his normal self-respect and to retain his individuality, supported by the consciousness of independence achieved through effort. The rehabilitation of the blind is a matter of the utmost importance, and merits greater emulation in connection with the every-day living of those unfortunate enough to suffer from complete visual disability.

Accidents and injuries, together with sympathetic ophthalmia, constitute the single greatest cause of blindness, being responsible for more than one-eighth of the entire amount in the United States. If one adds to this the blindness arising from poisons, foreign substances in the eye, exposure to heat, and from eye strain in industry, the percentage is raised so that one may state that a little over one-sixth of all blindness is occasioned by external injury or from causes other than disease.

In a most excellent volume, *"The Blind,"* (The Macmillan Co., 1919), Harry Best, Ph. D., has summed up the general knowledge pertaining to blindness. He presents not merely statements of their general condition, but excellent discussions of blindness and its prevention, the provision for education for the blind, children and adult. He describes, at length, the material provision that is being made for those afflicted with blindness and details the various types of organizations interested in their welfare.

The single chapter devoted to blindness and accidents merits a reading by ophthalmologists and surgeons, as well as by those interested in the social welfare of men. Here one grasps the significance of industrial hazards that are involved in work with abrasive wheels, clipping, cutting, or driving metal, hewing or carving of minerals, cutting wood, sand blasting, the handling of explosives and the dangers from the bursting of boilers or gauges or the breaking of belts. The dangers of powerful glares and intense heat, the likelihood of injury by hot or noxious chemical substances, particularly those used in connection with work with chemical and explosive industries are made patent.

"By reverting to the general table giving the several causes of blindness according to the census returns, we learn that nearly one-fifth (18.3 per cent) of all blindness from accidents and injuries is due to explosives, including those in mines and quarries, those in construction and similar work, and those from bursting shells in military actions; nearly one-eighth (11.8 per cent), to firearms; nearly one-tenth (8.9 per cent), to flying objects (not occurring in explosions); 5.9 per cent, to falls; 5.7 per cent, to cutting and piercing instruments; 4.1 per cent, to burns; 2.2 per cent, to animals; 2.2 per cent, to blows to the head; 2.0 per cent, to explosions not referred to above; 1.6 per cent, to explosions of a nature not indicated; 1.3 per cent, to unfortunate results of operations; 0.8 per cent, in mines and quarries; 0.4 per cent, to machines; and 34.8 per cent, to miscellaneous causes. Of blindness resulting from foreign substances in the eye, about half is due to acids and other substances of chemically destructive nature, and half to dust and other particles. Of that resulting from poisoning, 22.3 per cent is to be ascribed to wood alcohol; 18.5 per cent, to tobacco; 17.6 per cent, to chronic lead poisoning; 11.1 per cent, to alcohol other than wood alcohol; 8.3 per cent, to chronic occupational poisoning other than from lead; and 22.3 per cent, to other forms of poisoning." In the way of prevention it is important to realize that types of accidents vary somewhat in their most frequent occurrence with the period of life. "Injuries from cutting and piercing instruments are most common in the early years of childhood, being the leading single cause among accidents from the first to the ninth year, after which time they decrease more or less rapidly. Injuries from falls also happen most often in this period. Injuries from firearms are of greatest frequency in the late years of youth, being the foremost cause from the tenth to the nineteenth year, after which there is a gradual decrease. Injuries from explosives show the largest proportions in youth and early and middle adult life, or during its most active working period, representing from the twentieth to the fifty-fourth year the chief cause of blindness from accidents. Injuries from flying objects and from burns, though fairly constant through life, reach their highest mark towards middle life, those from the former being also the leading cause after the fifty-fifth year. Blindness from exposure to heat, from foreign substances in the eye, and from poisoning are, like injuries from explosives, of greatest occurrence during the working period of life. Blindness from strained eyes increases with advancing years."

These few figures are most suggestive of the lines along which attention must be directed in order to aid in the work of conserving vision. Basic figures are always requisite for framing programs. Legislation can be effective only when soundly founded upon facts. The gleaning of statistical material from all sources in the country is an essential prerequisite for visualizing the sources of accidents to the eyes. The establishment of divisions for receiving reports of accidents of all kinds, and of tabulating results is most necessary in order properly to devise laws and ordinances for the protection of the young and the old, in civil or industrial life.

While blindness is receiving more attention than ever before and while the community conscience is being fortified to accept blindness at a different valuation than heretofore, there is an imperative necessity for establishing every safeguard for the elimination of those unnecessary accidents which rob individuals of their highest potentials and tend to destroy the full social value of human beings. If the prevention of blindness can strike the same sympathetic cord in the community that is struck by the sight of the afflicted, the conservation movement would receive a new impetus, and the need for organizations for the conservation of vision would be greatly decreased.

"MODERN MEDICINE."

The developments of modern medicine are to be recorded in a journal to which, in new form, we give cordial welcome. *Modern Medicine,* in most attractive garb, steps into the field of medical literature, pointing out new horizons in health to be explored and expanded. Its aim is to discuss "the application of medicine and allied sciences to industrial efficiency and national health." Appearing monthly, it is to reflect the progress in medicine and health and present to the medical profession a résumé of the numerous problems in health administration and industrial and social health.

The basic thought underlying *Modern Medicine* is that in a world of ideas, the right to be well is by no means as important as the idea that people *must* be well, insofar as the science of medicine can make it possible. The new conceptions of medicine and surgery are swept along on a current of social progress, and those who would be consecrated by baptism need but to go toward the stream.

The initial number (May, 1919) is most promising, and, as an earnest of intention, it creates hopes and expectations, the realization of which will enrich medical knowledge. We bid our contemporary warmest greetings, and shall look to it for a spirit of cooperation that must shape the destiny of medicine in giving voice to the underlying principles of health conservation.—I. S. W.

Book Reviews

Surgical Treatment. A Practical Treatise on the Therapy of Surgical Diseases for the Use of Practitioners and Students of Surgery. James Peter Warbasse, M.D., Fellow of the American College of Surgeons, American Medical Association, American Academy of Medicine, New York Academy of Medicine; Surgeon to the Wyckoff Heights Hospital, Brooklyn, New York; Formerly Attending Surgeon to the Methodist Episcopal Hospital, Brooklyn, New York. In three octavo volumes with 2,400 illustrations and a separate index volume. *Volume III,* 861 pages; 864 illustrations. Philadelphia and London: W. B. Saunders Company, 1919.

In the review of volumes I and II (May issue) we called attention to the general character and unique features of this large, comprehensive, thoroughly interesting and altogether attractive work.

Volume III continues the surgery of the *abdomen* (appendix and bile tract), and deals with that of *hernia,* *the rectum and anus, the pelvis, the genito-urinary tract, the female generative organs, the extremities* (not including fractures and dislocations), *plastic and cosmetic surgery* and such miscellaneous subjects as the surgical therapy of the *new-born, burns and injuries by electricity, radiation and gas poisoning, electricity, heliotherapy, radiation, massage,* etc., in surgical treatment, *first aid,* and *bandaging.*

To these is added a chapter on the *economics of surgical treatment,* written in Warbasse's characteristically earnest and convincing (and always elegant) style, in which he urges the socialization of surgery (and medicine), the separation, in individuals, of the specialties of diagnostics and operative surgery, and the establishment of diagnostic clinics. This is a theme on which the author has often written; indeed he may be said to have been the torch bearer along a path on which we have already made some footsteps. The growth of group medicine, on the side of the profession, and legislative discussions and enactments, on the side of the community, suggest that the socialization of medical practice much in the manner that Warbasse has urged it, may come to pass before many years.

The production of a work on surgical treatment of such a comprehensive character as this, including as it does, the surgery of the eye, ear, and gynecology, was a great undertaking for a single author. It was a labor considerably greater than the preparation of a treatise on operative surgery only, for Warbasse has written his work not only for the expert surgeon, capable of performing any indicated procedure but also "in the interest of the surgical patient" and "not to glorify surgery" —for the less experienced. With this purpose constantly in view he has described not only the ideal procedure, for the skilled specialist, but also less hazardous and non-operative measures for the less skilled.

Each volume carries its own index. The combined index for the three volumes, bound separately, is very convenient.

Surgical Aspects of Typhoid and Paratyphoid Fevers. Founded on the Hunterian Lecture for 1917, amplified and revised. By A. E. Webb-Johnson, D.S.O., M.B., Ch.B. (Vict.), F.R.C.S. (Eng.); Temporary Colonel, Army Medical Service; Consulting Surgeon British Expeditionary Forces, France; Hunterian Professor of Surgery, Royal College of Surgeons of England; Assistant Surgeon to the Middlesex Hospital. With Foreword by Lieut.-Gen. T. H. Goodwin, C.B., C.M.G., D.S.O., Director-General, Army Medical Service. Duodecimo, 190 pages, illustrated. London: Henry Frowde, Hodder & Stoughton, Oxford University Press, 1919.

The appearance of this small volume immediately calls to mind the earlier and larger one on "The Surgical Complications and Sequels of Typhoid Fever," by W. W. Keen. It is a tribute to the completeness of that classic work that this modern review of the subject adds practically nothing to what Keen produced twenty-one years ago!

Neoplastic Diseases. A Text-Book on Tumors. By James Ewing, A.M., Sc.D., Professor of Pathology at Cornell University Medical College, New York City. Octavo, 1,027 pages, 479 illustrations. Philadelphia and London: W. B. Saunders Company 1919.

With very few exceptions the only comprehensive books on the study of tumors are written in foreign languages. This, however, is not the only reason why Ewing's book makes an especial appeal to us. There is no book on tumors in any literature quite like it, either in the fulness and comprehensiveness of its contents, or in the originality of its viewpoint. Ewing discusses not only the pathology of each type of tumor down to its minutest details, but also the morbid phases as modified by the regional distribution. The latter is a viewpoint that is entirely lacking in other books on the general morphology of tumors, and we need hardly say it invokes aspects of fundamental clinical importance. In addition Ewing devotes considerable space in the text to comment upon some of the more important clinical features, not only in regard to the type of the tumor but also in its regional distribution. This represents a correlation between pathology and clinical medicine that is refreshing in the works on pathology.

The discussion maintains the high plane that one would expect in Ewing's publications. The text reveals a fine combination of all available facts and a wide personal experience. Ewing's temperate critique is everywhere present and nowhere have we discovered a rash statement or a misquotation. The illustrations are nearly all original and of superb quality. This is a book of which American medical literature may justly be proud.

An Outline of Genito-Urinary Surgery. By George Gilbert Smith, M.D., F.A.C.S., Genito-Urinary Surgeon to Out-Patients, Massachusetts General Hospital. 12mo; 301 pages; 71 illustrations. Philadelphia and London: W. B Saunders Company, 1919.

This is a very practical little volume of diseases of the genito-urinary tract. All of the subjects discussed—and these include the diseases of the entire tract from urethra to kidney—reflect the most modern conception and practice in the care of these illnesses. While intended to relate to the male genito-urinary tract, mention is made of the differences existing in the female, especially with regard to the female urethra. The operations described are done so very lucidly and are illustrated with appropriate drawings. Each chapter is followed by a list of the most important references pertaining to the subject.

Military Surgery of the Ear, Nose and Throat. *Medical War Manual No. 8.* By Hanau W. Loeb, M.D., Major, Medical Reserve Corps, U. S. A. Philadelphia and New York: Lea & Febiger, 1918.

A new member of the war manual series is the eighth, Military Surgery of the Ear, Nose and Throat, by one of the foremost American specialists in this field. Although it treats the subject matter from an angle other than that of the civilian practitioner it is still a valuable little book for any one engaged in the practice of these specialties. The general practitioner will find it a help, also, when confronted with some injury of the ear or upper air passages.

The first part of the little book deals with injuries of the ear, taking them up in regular order, beginning with traumata of the external ear and proceeding toward the labyrinth. There is also a section on the re-education of the deaf and one covering the subject of speech defects.

Injuries of the nose and sinuses occupy a short chapter. Injuries of the throat, esophagus and trachea are treated at greater length.

There is a chapter on malingering, very valuable for those who are obliged to examine the hearing of people either for military or industrial purposes, and one on the ear and aviation, together with sections on the standardization of tests and, what is perhaps even more important, standardization of examiners.

There is a very complete bibliography at the end of the manual which will be found most convenient by any one wishing to follow, more completely, the references mentioned in the text.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries, and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M.D. Assisted by Leighton F. Appelman, M.D. *Volume XXII,* No. 2, June, 1919. Philadelphia and New York: Lee & Febiger.

This number, of 329 pages, reviews the recent literature of the following subjects: *Hernia,* by Wm. B. Coley; *Surgery of the Abdomen,* by A. O. Wilensky; *Gynecology,* by John G. Clark; *Disorders of Nutrition and Metabolism, the Glands of Internal Secretion, the Blood and Spleen,* by Elmer H. Funk, and *Ophthalmology,* by Wm. F. Hardy.

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[American Journal of Anesthesia and Analgesia]

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July,

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SOME OBSERVATIONS ON ANESTHESIA AS A SPECIALTY AND THE ANESTHETIST AS A SPECIALIST.*

A. S. McCORMICK, M.D.
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The word anesthesia was coined November 21, 1846, by the poet Oliver Wendell Holmes (Boston, 1809-94), who prefixed *an* to the Greek *aisthanomi*, —creating the new word meaning *inability to feel.*

Anesthesia and the bass drum have much in common. Any Tom, Dick or Harry can pound a drum but only the trained drummer can play it. Any one can pour or drop ether on a mask, according to the ideas of the majority of physicians, but how many have had proper instruction in anesthesia which is obtainable only from expert specialists and not during an internship. The average intern gives anesthetics because compelled to, not because he wishes to. He is usually more interested in the technic of the operation and cares nothing about anesthetic or patient. W. D. Gatch of Indianapolis, says, "only rarely does an internship give proper training." P. J. Flagg, of New York, condemns the slip-shod custom of entrusting anesthetics to the junior intern. The arrival of the new man is, in some hospitals, followed by a series of deaths, upon the table, of unfortunates entrusted to his ignorance. Any hospital that depends on haphazard anesthetics given by the tired, untrained nurse or overworked, uninterested intern cannot have expert anesthesia or a low death rate. F. W. Pinneo, of Newark, N. J., describes interns, who while good technicians, betray, when questioned, ignorance of the theory and important facts of anesthesia. Yet it is a lamentable fact that some large hospitals have no visiting anesthetist on their staffs.

No specialty has met such unreasonable, narrow, undeserved opposition as anesthesia. Until recent years, the anesthetic was considered of no importance and any one and every one capable of giving it. It was supposed that the anesthetic did the work. Now we know better. Almost every physician fondly considers himself as skillful as the greatest specialist, even though he give but 12 anesthetics per year, whereas the latter may give that many and more every week. With too many of the profession the desire for the fee outweighs any consideration of their ability, the welfare of the patient or preference of the surgeon. The idea that there is anything more to learn than dropping or pouring ether or chloroform or a mask appears to them so preposterous that they will neither learn nor reconcile themselves to the fact that anesthesia, as a specialty, is as important as any other branch of the practice of medicine.

Another hindrance to progress is the attitude of many surgeons. Some are indifferent to everything but the operation (or fee) and care nothing about the condition. The chances or comfort of the patient, or the mentality and capacity of the anesthetist. Others prefer the expert but lack the courage to insist upon his use for fear of offending the man who refers the case,—often one whose anesthetic methods are so bungling and crude as to worry the surgeon from start to finish, cause him to hurry and sometimes find to his mortification a piece of tonsil remaining or the uvula amputated or incomplete closure of the abdomen followed by hernia and the condemnation of the patient. General practitioners often say: "I give an anesthetic in fear and trembling. If anything unusual occurs I don't know where I'm at." The obvious inference is: "Why do you and what moral right have you to give anesthetics?"

When an operation is required would it not be wise for the physician to ask himself: "What would I want for myself or family? Should I be willing to trust my life to anyone or would I want the best expert obtainable?" As G. W. Kennedy, of Sharon, Pa., says, "People now ask, 'who is to give me the anesthetic?'" They fear anesthesia, not the operation, and their usual request is: "Don't give me too much, but be sure I'm asleep." The expert knows the why and wherefore of anesthesia and where he is at. The general practitioner does not. N. Senn, now deceased, said: "Very few physicians are safe anesthetists. An anesthetic is comparatively safe in the hands of an expert but a dangerous weapon is left to the inexperienced." E. R. Kemp, of Knoxville, Tenn., says: "No anesthetic can overcome lack of skill and judgment or carelessness and ignorance."

By constant team work the anesthetists learns the methods, ability, characteristics of the operator and how to deal with them. The latter learns to depend on his anesthetist and is relieved of all worry. If not able to insist upon a skilled anesthetist for all his operations he should at least have sufficient backbone to do so, for all dangerous work or cases requiring more than ordinary care and skill. Unless surgeons properly support and encourage the experts they cannot expect more than a very few physicians to devote their time to anesthesia. If they will demand the expert anesthetist and permit the man in charge of the case to otherwise assist, there will be less desire on the part of Tom, Dick and Harry to give the anesthetic.

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Swearing at or bullying nurses is impolite, unnecessary, and rude. Howling at the anesthetist is similarly out of place. If the latter be having trouble he will do his best. Encouragement and sympathy will help him and the patient more than vulgar bawling or cursing. In the words of W. S. Chase, of Akron, Ohio, "Swearing should be indulged in only when necessary for the success of the operation." The surgeon has yet to live who can supervise the anesthetic and operate at the same time.

Physicians don't care to patronize a surgeon who continually "butts in" on the anesthetist's work. The man who "butts in" usually bungles and fumbles and does more harm than good. For the operator to dictate to the anesthetist is no more proper than for the latter to direct the operation. The surgeon should remember that the anesthetist is not a servant but an highly trained and skilled specialist whose knowledge of anesthesia far surpasses his own. Let him therefore exhibit the same courtesy and patience toward the anesthetist as the latter does toward him. If he be unable to refrain from interfering, day after day, he may find a nurse anesthetist cheaper financially and more likely to submit tamely to his whims and eccentricities. J. A. Zabrocki, of Chicago, says, "The nurse anesthetist has proved practical mechanically, but scientifically lacking and dangerous." A. A. Freiberg, of Cincinnati, Ohio, says, "The science of anesthesia depends on physicians for its future development."

A. D. Bevan, of Chicago, adds: "No matter how well trained, she (the nurse) is not prepared to give instruction nor to add to the existing knowledge of the science by properly conducted research." In all its history, no nurse has contributed anything of value to the science or art of anesthesia and, it is likely, never will. The nurse will always remain a nurse.

It is the moral duty of the surgeon to protect the anesthetist from loss by compelling prompt payment of his fee. The patient will cheerfully obey his doctor if he insist on cash before or immediately after operation for the anesthetic. The patronage of a surgeon whose patients are chiefly paupers and dead beats and who operates on anything and everything in order to get a job or add to his statistics is of no value and is better avoided.

The plea of a *dead beat or cheapskate*: "I didn't engage you," as an excuse for not paying is of no avail in law. On April 7, 1916, Justice C. W. Dickerson, of Akron, Ohio, condemned one of this type to pay my fee and court costs. Other cases kindly furnished by the A. M. A. Law Department are 64 Conn. 432, 40 Iowa 84, 47 Iowa 625, N. Y. 138, N. Y. 1072, N. Y. 139, N. Y. 934, 67 Wis. 572. In every case the law decided that if an assistant be required the physician in charge may engage him. The patient whether consulted or not is legally responsible for payment of the assistants. While some few surgeons have contributed valuable knowledge to anesthesia, only rarely is a surgeon an expert anesthetist. Equally rare is the surgeon who does not believe he is one, an anesthetist. G. W. Crile, of Cleveland, frankly admits that he dare not give an anesthetic. J. T. Gwathney, of New York City, says: "It is almost impossible for a surgeon to keep up with the literature of his own specialty. That he is not up-to-date on anesthesia is proved by the type of anesthetics witnessed in some of our best known clinics." It is nevertheless possible to learn much about team-work from a co-operative surgeon; but proper instruction in anesthesia is obtainable only from expert anesthetists.

The greatest advances in anesthesia have been effected by the men who have devoted themselves to its art and science. Surgeons, coming to operation, say that if compelled to choose between poor anesthetist and good surgeon on the one hand and poor surgeon and good anesthetist on the other, they would choose the latter combination. They are willing to take chances with a surgeon but are very particular about the anesthetist. F. V. Dunderman, of Akron, Ohio, illustrated this by saying: "I know of ten men here who could take out my appendix, but only two who may give me an anesthetic." In Great Britain and Canada the status of the anesthetist has been long established. In the U. S. A. anesthetists are compelling recognition and raising the standard of their specialty. In real medical educational centres anesthesia has come into its own and surgeons demand the expert. In other cities recognition comes more slowly yet no less surely and the anesthetist and his science will compel it in spite of opposition which is nearly always that of envy or the prejudice of ignorance.

To be a real expert the anesthetist must limit his work to the specialty and devote all his time to study, experiment, and practice. He must be cool, patient, careful, systematic, fearless, especially the last, so that he will not do anything merely because this or that person thinks he should. He knows best what is required. When an operator becomes rattled under a nervous strain the anesthetist's cool head and courage will be required. The anesthetist should be consulted about the preparation of the patient. He should meet the patient as early as possible, examine heart, lungs, nose, throat and gain the confidence of both patient and relatives. The latter may annoy you, but if ever your wife or child undergo even a simple operation you will realize the words of L. E. Brown, of Akron, Ohio, that, "It isn't so damn funny after all." Flagg condemns the indifferent or bullying manner of the average intern. This fault is inexcusable and a disgrace to any hospital permitting it. Examination of the throat is important, because as D. W. Stevenson of Akron, Ohio, warns, a latent diphtheria may be present and combined with the anesthetic is often fatal, and always dangerous.

If properly interested in his work the anesthetist will acquire skill in diagnosis and prognosis from even the appearance of the patient. It is possible to diagnose pus from the odor of the patient's breath and correctly in 90 per cent. of such cases.

The anesthetist should be equipped to give an anesthetic any time, anywhere, for anyone. His rule should be: promptness in keeping engagements; first call first served and unfailing cheerfulness and courtesy to all his patrons. He should uphold the honor and dignity of his specialty, especially among those "critics" who possessing none or little of his skill yet fondly imagine themselves his equal, even superior. Above all he should avoid criticism of operators and anesthetists, even the "knocker" who is suffering from colic caused by the unripe fruit of the grapevine. He should keep out of the infernal, eternal wrangling and scrapping of surgeons. He should be neat in appearance and dress and at all times the gentleman.

He should join at least one of the Associations of Anesthetists, and, of course, his local society and state or provincial and national associations and attend and be interested in their meetings. He should read every book bearing upon anesthesia, and its current literature in various journals. He shall read everything, judiciously, by remembering what is of value and forgetting the rest.

The lives of many persons of all ages will depend upon the anesthetist. My youngest patient was 7 days, my oldest 85 years. There are 4 causes of death:

1. Patient.
2. Operator.
3. Anesthetist.
4. Anesthetic.

Kemp says: "Patients will die after operations in spite of the anesthetic; but for some time to come it will be the scapegoat and compelled to bear the sins of others." Too many surgeons endeavor to conceal other and real causes of death by blaming the anesthetic or anesthetist. In order that the latter shall not be at fault he must never relax his attention to the patient's eyes, respiration, pulse, color, nor forget his responsibility.

Ethyl chlorid kills by causing asphyxia either from overdose (more commonly) or secondary to spasm of the respiratory tract. Death rate 1 to 1,100. Chloroform kills by first stopping respiration then causing sudden heart collapse. Death rate 1 to 3,000. Ether kills by causing respiratory failure. Death rate 1 to 10,000. Nitrous oxid kills by causing sudden heart failure, not by asphyxia as usually claimed. Death rate 1 to 600 or less according to Baldwin of Columbus.

The anesthetist must therefore be on the alert for danger signals. Nothing is so certain to catch him napping as talking, especially when some one is trying to be funny. The operation is a serious affair for patient and relatives. Why do so many men consider it an appropriate occasion for comedy? By minding his own business and taking no part in gossip and jokes the anesthetist will avoid blame if trouble occur.

All of which merely proves that the only proper and competent person to give anesthetics is the physician expert specialist.

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THE ANESTHETIST ON THE HOSPITAL STAFF.*

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In the commercial world every vocation and every line of industry in which there is danger to life the state law compells safety devices or the posting of danger signals to warn employes. The fact cannot be gainsaid that a large proportion of the anesthetic deaths are preventable and yet what are the precautions generally taken to safeguard the patient during narcosis? The saving of life in this respect demands the attention of the entire medical profession. The anesthetist who kills the patient through overdosage or the improper selection of the anesthetic can no longer hide behind heart disease or the status lymphaticus and in common vernacular get away with it, at least not with those who are prone to analyze results or cause and effects.

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The slogan to be adopted, the safety device, is a single word, *education*. Every medical college should give theoretical and practical instruction in anesthetics and this course should be made compulsory, before a student is admitted to graduation. Fortified with such instruction the graduate who serves an internship in a well regulated hospital with a qualified anesthetist on its staff will be a distinct asset to the community, regardless of the branch of medicine, he may later elect to practice. Nothing can improve the status of the qualified anesthetist more than the education of physicians generally, in the subject of anesthesia. Gatch says: "Any art must suffer if it lacks an intelligent and appreciative clientele. By the extent to which anesthesia as a specialty, fails to command the support of the medical profession is to be measured the failure of the latter to appreciate the advantages of good anesthesia".

The public is surely learning the gravity of anesthesia in both its immediate and remote effects as is evidenced by the frequent question, "Who is going to give me the anesthetic?" or by engaging the anesthetist in the same manner as they engage the surgeon. When people generally understand that the life of the patient often rests with the anesthetist, better anesthetic service will be demanded and the administration of anesthetics will assume the importance and dignity it deserves. Fortunately the time is past when the most inefficient person present is chosen to administer the anesthetic. W. W. Keen, a surgeon of wide experience and international fame has pertinently said: "Next to the surgeon and even before his first assistant stands the anesthetist holding the scales of life and death."

Combine experience with an observant, analytical mentality and a clear judgment and the result is an efficient person whose opinion can be respected. The anesthetist who has the above qualifications and also possesses tact, sympathy and a reassuring personality is a definite asset not only to the surgical department but to the hospital that claims him as a member of its staff. The influence that such an individual exerts is unconsciously felt throughout the institution. It is passed from physicians to nurses, from nurses to patients and from patients to friends and the result is that a confidence is established before the patient goes to the operation room. Naturally the fear of the anesthetic is lessened if not altogether abolished.

RELATION OF THE ANESTHETIST TO THE SURGEON.

A perfect confidence, understanding and harmony should exist between the surgeon and anesthetist otherwise the best interests of the patient may be sacrificed. In all surgical risks it is a wise procedure for the surgeon and anesthetist to consider the case together. The surgeon explaining the surgical procedures he desires to institute, the physical condition of the patient and operative requirements can then be discussed and the selection of the anesthetic and the method of its administration determined. Of course this procedure can only be followed when qualified, experienced anesthetists are employed. What are the advantages to the surgeon in working with the specialist in anesthesia? The surgeon who has confidence in the judgement and ability of the anesthetist is relieved of all anxiety and worry as to the condition of the patient and his mind is free to engage in the surgical problem at hand. He is aware that the anesthetist is ever on the lookout for changes in respiration and circulation and will warn him of impending danger or approaching shock. The capable anesthetist, knowing the exact condition of the patient can intelligently guide the surgeon as to the advisability of added operative procedures. This so-called *teamwork* is responsible for better surgery and safer anesthesias both immediate and remote. Further the patient is made to feel that the surgeon has left nothing undone which will contribute to the success of the operation. It has been my experience that those surgeons who are most familiar with anesthetics, their action and the different methods of administration are the ones who are most willing to consult or be influenced by the qualified anesthetist. It is only just to assume that the physician who devotes all his time and study to this particular field of medicine should be better informed than the surgeon whose studies are along the line of surgery, consequently a qualified anesthetist is primarily a *consultant*.

RELATION OF THE ANESTHETIST TO THE INTERNES.

The value of supervision of the anesthetics given by the inexperienced internes can not be overestimated. He learns the method of handling patients with tact and courtesy and of allaying their fears and apprehensions thus obtaining their confidence and assurance of his ability. The instruction of internes should be directed toward the administration of anesthetics in such a manner that the occurrence of complications due directly to the anesthetic may be foreseen and prevented.

The beginner in the administration of anesthetics should be supervised in the same strict manner that he is in other branches of medicine and surgery, His college course does not fit him for anesthetic work any more than it fits him to perform operations or assume the care of a severely sick medical patient without supervision. The surgeon who relegates the administration of the anesthetic to the untrained junior interne without supervision is morally responsible for the outcome. It is just as reasonable to turn over the surgical patient and allow him to operate without guidance and expect him to do satisfactory work.

Internes enter hospitals in order that they may be taught to properly put in practice, under experienced supervision, what they have been taught theoretically in college. Just why surgeons should expect these men to be competent to administer anesthetics is as incomprehensible as that they are willing to risk the patient's life in their hands. Surgeons, in general, are too prone to let the adminstration of anesthetics be a matter of unthinking routine. Ignorance is not bliss when life is at stake. Danger must be recognized before it can be eliminated and the proper instruction of internes is not possible without qualified anesthetists on the staff. The proper teaching of anesthetics makes the administrator thoughtful, attentive and wary. It gives him confidence and wisdom under trying circumstances as well as a desire to seek more light the more he finds. The wish to acquire more knowledge and the finding of it brings joy in one's work and abolishes completely all thought of monotony or drudgery. The most successful teacher is he who can arouse the greatest amount of interest in the subject at hand. Flagg says: "The proper administration of an anesthetic is more than a mere mechanical performance, it is an art. To give an anesthetic is one thing, to practice the art of anesthesia is another." At the close of every interne's service he should be master of the principles of anesthesia and the different methods of producing and maintaining narcosis with a minimum of risk and a maximum of competance.

RELATION OF THE ANESTHETIST TO THE PATIENT.

The relation that the anesthetist bears to the patient is analogous to that of the surgeon. The life or future well-being of the individual may be jeopardized through carelessness or ignorance of the one or the other.

After the anesthetist is acquainted with the physical and mental condition of the patient, the operative requirements and preliminary preparation, the anesthetic to be given and the method of its administration can be determined. The attitude of the anesthetist toward the patient should be gentle and sympathetic. Mystery is disconcerting to most people consequently it is the better part of discretion to inform them why certain details such as the position on the operating table or covering the eyes is necessary. One of the greatest assets that an anesthetist can have is the ability to gain the confidence of his patients.

RELATION OF THE ANESTHETIST TO THE HOSPITAL.

The same confidence which exists between the surgeon and the anesthetist should exist between the hospital management and the anesthetist. It is the duty of the anesthetist to consider that a part of his duty is to help maintain a high-standard reputation for the hospital and to promote its interests by avoiding undue waste. It is desirable that he administer the anesthetic to all patients whose general condition makes the administration especially hazardous, as a large majority of these patients can be safely carried through a properly conducted anesthesia.

Only established methods of anesthesia should be employed or allowed. All experimental work should be confined to the lower animals and then sufficient time allowed to elapse for secondary effects to manifest themselves before the anesthetic or method is introduced into the hospital.

THE RELATION OF THE HOSPITAL TO THE ANESTHETIST.

The report of the Committee on Anesthesia of the American Medical Association (1912) was to the effect that: *"Every hospital, certainly every large hospital, should have as a regular member of its staff an attending anesthetist whose authority in his special branch should be as complete as that of the attending surgeons in theirs."*

The hospital that has not a medically qualified anesthetist on its staff is a menace to the best interests of the prospective patient and attending surgeon. What is meant by a qualified anesthetist? The qualified anesthetist is one who is capable of making a physical examination of the patient, can interpret laboratory findings, is familiar with operative requirements, able to weigh the evidence and select the most suitable anesthetic and the method of its administration for the particular patient under consideration. These qualifications require not only a medical education but special training in the theory and practice of anesthesia as complete as is demanded in the field of surgery or its correlated specialties. The tyro who gives an occasional anesthetic or the medical man who gives a few anesthetics to help pay expenses should not be considered qualified. It may be urged that I have made the requirements too high and I will reply by asking if less is demanded of the physician who specializes in other branches of medicine and yet with the exception of surgery there is no part of medicine the practice of which is capable of destroying life so quickly as is the administration of anesthetics.

All matters pertaining to the department of anesthesia should be referred to the anesthetist in charge. He should be privileged to purchase, at the hospital's expense such apparatus as is required for successful work. He should also be allowed the brand of anesthetic that according to his experience and investigation is the most efficient and the safest.

The author cannot refrain from making a plea for the unfortunate poor in our county institutions. The hospital management should not allow these people to be used by a set of faddists to demonstrate some new agent or method of anesthesia or to revive a method which has been abandoned because of high mortality or evil secondary effects. The economic and social value of a charity patient may be greater than that of the private room millionaire.

REMUNERATION.

For years the professional anesthetist has been recognized in England but it has only been recently that the United States has developed this speciality although the first anesthetics were given here and the greatest advancement in this science must be credited to American physicians.

In order that medical men and women shall devote their time and study to anesthesia the public as well as the medical profession must be taught that safety lies in having the anesthetic well administered and that such expert service must be properly recompensed according to the skill required and the responsibility assumed. It is evident that the medical profession itself does not sufficiently appreciate this point.

Unless the anesthetist is a *full time* teacher with a regular stipulated compensation his services should be paid for by the patient, as is the operation fee. This relieves the hospital of the responsibility and the extra expense of maintaining an anesthetist. This arrangement at once changes the whole complexion of the situation. The anesthetist assumes a personality which he did not before possess for he has been only a part of the hospital machinery and looked upon by the surgeon and patient much in the light that the surgical nurse, orderly or other operating appurtenances are. Patients are not only willing but glad to pay the extra fee if the occasion for it is properly explained to them. The fee to be charged must rest upon the financial circumstances of the patient and the difficulties of the anesthesia. The bills should be sent directly to the patient from the anesthetist and not through the surgeon or the hospital. This latter point is important to the anesthetist as it establishes an acquaintance with the patient and his friends and if the anesthesia has been satisfactory they will think of him if another operation becomes necessary.

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THE DOWN-TOWN ANESTHESIA CLINIC.*

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The subject assigned to me is so foreign to the thoughts uppermost in the minds of us all that I feel almost a slacker in presenting it. However in due time the war will be over and it is possible that many of us may land, thereafter, in new locations. In case we do I feel sure that a short story of my experiences may be of some value.

In 1915 my practice consisted largely of anesthesia and I was using my home as telephone headquarters with no office whatever; doing largely anesthetics for major surgery in the various hospitals. An occasional call from a dentist however broke the routine and in many such cases the dentist and patient alike objected to going to the hospital both because of the time and expense involved. It was suggested to me that a down-town office equipped to care for dental and minor surgical cases would be useful, as we had no exclusive specialist in exodontia in our town, and some surgeons were also anxious to establish extra hospital clinical facilities.

After the Mexican border demobilization in 1916 I made bold to try such a plan, my practice from that time being confined exclusively to anesthesia. An office was equipped with a waiting room and a small operating room with an adjoining room containing a cot on which a patient could lie down after his anesthetic. In due time the place became popular and we moved. I say *we* for two reasons. First, it avoids a too egotistical repetition of the pronoun *I* and second, chiefly because my office assistant, a girl of twenty-one, has been more than half responsible for the success of the experiment. Her interest and faithfulness have made it possible to make definite dates and keep them properly, and see that no dentist or surgeon has felt himself slighted or inconvenienced. I bespeak for any of you, who may make a like venture, a careful selection of your assistant and I wish you good luck.

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In February 1918 we found ourselves with three units of floor space in the newest and most central office building of our town. The population is 65,000 and we have a hundred doctors and fifty dentists in peace times. In this building some fifty doctors and dentists have their offices. We are equipped with a large reception room with easy chairs and reading matter to divert the attention of fond relatives. Our operating room is of ample size with large south and west windows. In it we have a modified French chair-table such as you have seen Drs. McKesson and Denman use in Toledo for tonsillectomy and nose work. This we find very convenient for the dentist's use also, as it can be tilted into a half reclining position readily and quickly back to the head-forward position during recovery after bloody extractions. It also makes an excellent flat operating table. We have also a dental engine, a sink with foot pedals to turn on water and a sterilizer for instruments, gauze, towels, gowns, et cetera, and a sterile water tank. In short the usual equipment for a minor surgery room. The sterilizer, however, we plan to replace with a better one in an adjoining room which we also use for storage of supplies.

To each side of the operating room is a room containing two or three cot-beds; separate doors open into each room through which the operating chair will roll with ease. Thresholds for such a door we have found are a nuisance and should be removed. One of these rooms we use for female patients and the other for males. There is running water in each, a mirror, etc. One thing we miss very much is a toilet and one should not be forgotten when planning such a place in a new building.

In addition, off the men's retiring room, I have a private office with desk and chairs which serves also as a good loafing and smoking room and a place in which doctors can wait when they are early; it has a separate exit to the building corridor.

Our hospital work with major surgery still occupies half our times and makes up half our income but that is mostly accomplished in the earlier part of the day. The down-town work consists of noon-time and afternoon appointments and occupies time which would be otherwise idle.

Dentists bring all sorts of difficult extractions and painful cavity preparations. Surgeons bring circumcisions, abscesses, and fractures and are gradually bringing more minor operations as time goes on. The head specialists bring some work and they too are gradually bringing more. Some dentists who used to attempt their own anesthesia now bring it to us. Others still do their less difficult cases and bring the more difficult ones to us. We take all sorts of cases, always attempting to give satisfaction regardless of expense. I mean we don't save anesthetic agents and let the patient feel the operation. We make careful physical examination on all suspicious risks. Others are accepted as they come. A sphymomanometer and stethoscope are constantly present and frequently used. Here again the well trained and alert assistant is useful. She often warns me that the next patient is short of breath or shows some other evidence of needing careful examination.

We attempt, as I said, to give satisfaction to operator and patient and charge a fee that will pay expenses and a good profit. We make no fees in advance and have no set prices. Sometimes one tooth extraction takes ten seconds and sometimes it takes an hour and a half. The cost of materials and the value of our time make it necessary to gauge the fee by the work. Our minimum fee, with present cost of materials is seven dollars, the maximum is usually not over fifteen dollars. In other words our fees are considerable less than for similar work in hospital because less time and trouble is involved.

As to anesthetic agents used we aim to use N_2O-O as a routine. In particularly nervous patients we use as preoperative sedatives morphin and scopolamin, sublingually, as a rule. Ether we add very rarely and of course no chloroform for we do not use that even in the hospital.

We keep a card record of every case with physical findings when made, approximate weight, sex, complexion, and other details and also the assistant's estimate, each time, as to the degree of satisfaction to patient, surgeon and dentist. Also a record of what work was done and the length of time.

As to the satisfaction of my patrons. I think I can say this: there are none who have fault to find with our work. We aim to keep an abundant supply of N_2O-O and use it freely. Many patients and some doctors object to the fees but they come back and their friends come back. Satisfactory anesthesia and too large fees work out better than bargain sale fees and unsatisfactory anesthesia; especially as in open mouth work one cannot wisely be over economical of gases when using N_2O-O anesthesia. People forget the fee but they never forget the hurt nor fail to tell their friends about it.

We have made no start with local anesthesia as yet but have plans regarding it for the future. I believe it a very useful addition in connection with such an establishment as I am describing. I know that many dentists would appreciate such service greatly as they prefer not to bother with learning the technic of local nerve-blocking and would feel safer in employing one who devotes his time to such work.

As to the preoperative preparation of patients we worry little about it. We prefer, when possible, a light meal for the last before the operation. Liquids are allowed at all times. Much of our work is done just before or during the noon-hour because patients have then an empty stomach and at the same time we do not disturb the usual routine of the patient in regard to eating. Every patient takes off his or her outer garments above the waist and corsets are removed by the women. A sheet serves as drapery when coming to the operating room. Every case must go to the toilet before undressing.

As to the after-care the only difficulty is to be sure that patients with blood in mouth or nose, spit it up and do not swallow it. That we accomplish by using pharyngeal packs during the operation when necessary for dental work and by changing to head forward position before removing the pack. The patient is usually awake before the pack is removed in such cases. Then the lateral position in the cot with face turned down by the pillow makes it easy to expectorate without rising up in bed. In this way we have little swallowed blood and little vomiting. The time required for recovery varies from one minute to three hours. Occasionally a woman in poor health who has been nauseated requires help to get home but this occurs rarely.

As to the success of the venture I think I can say that the men who are familiar with the place are well pleased. The place has been running in its present location now for eight months and is paying my total expenses with a nice profit besides.

I hear objections both from doctors and patients as to prices, occasionally. That bothers me not at all. I attempt to pay expenses and a net fair fee for myself in each case. I don't care to work on any other basis. The one thing I do strive for is to satisfy patient and operator. If I fail in that I wish no fee and I collect none. In the long run I believe that plan wins out.

As for *business getting* activity it is all with the dentists and physicians. The place is for their use and their convenience and consideration for them comes first. If Mrs. Jones calls up in regard to an anesthetic, because her neighbor Mrs. Brown was pleased, I ask after Mrs. Brown's health and tell Mrs. Jones to make any arrangements she sees fit with her dentist or doctor. His office calls mine and makes the appointment.

One point which we lay emphasis upon and which I think is a business getter is prompt collection direct from the patient. We never bother a physician or dentist about a patient's bill. A statement is rendered before the patient leaves the office and seventy-five per cent pay them. If there is to be a loss we assume it, preferring not to bother the doctor with finances. So we avoid making an enemy of the doctor and patient alike, for every patient who owes you is your enemy.

The future for such a venture, I believe, is bright. I know ours is not yet half-grown. Several additions have been planned for the immediate future; one, a permanent graduate nurse assistant. So far we have only employed the extra assistant as occasions demanded.

We have considered seriously the manufacture of our own N_2O also. Frequently other additions suggest themselves or are suggested by physicians and dentists. When the war is over I trust many of you may develop down-town minor surgery and dental clinics of much larger scope.

539 Frances Bldg.

THE INTERSTATE ASSOCIATION OF ANESTHETISTS HAS BEEN ACCORDED THE DISTINCTION OF A JOINT MEETING WITH THE AMERICAN ASSOCIATION OF GYNECOLOGISTS AND OBSTETRICIANS, ONE SESSION OF WHICH WILL BE DEVOTED TO PAPERS OF MUTUAL INTEREST. THIS FIFTH ANNUAL MEETING WILL BE HELD IN CINCINNATI, OHIO, SEPTEMBER 15-17 AT THE HOTEL GIBSON, WHERE THE INTERSTATE WAS ORGANIZED IN 1915. A LARGE AND ENTHUSIASTIC ATTENDANCE IS EXPECTED SO MAKE YOUR HOTEL RESERVATIONS AT ONCE.

ORGANIZING THE SPECIALTY OF ANESTHESIA.*

F. H. McMECHAN, M.D.,
AVON LAKE, OHIO.

The Specialty of Anesthesia began its organization in the old London Society of Anesthetists, which has since become the Anesthetic Section of the Royal Society of Medicine. Here in America the first effort at organizing the specialty was made by a number of anesthetists who founded the Brooklyn Society of Anesthetists, which later was elaborated into the New York Society of Anesthetists. In 1912, at Atlantic City, during the meeting of the A. M. A., the American Association of Anesthetists was founded and held its first scientific session in Minneapolis the following year. In May, 1915, the Interstate Association of Anesthetists was formed in Cincinnati during a meeting of the Ohio State Medical Association. Other smaller clubs of anesthetists have been established in Louisville, Ky., Providence, R. I., Indianapolis, Ind., and Kansas City, Mo. The only other foreign society is the Scottish Society of Anesthetists founded in 1915.

This organization of the specialty spells progress. Not only have these organizations been founded, but an Official Organ, the Quarterly Supplement of Anesthesia and Analgesia and the American Year-Book of Anesthesia and Analgesia, have been established to take care of printing the transactions of the various associations and collating all the international research and clinical progress in anesthesia and analgesia. While this brief résumé would indicate that a good deal has been accomplished, much still remains to be done in many ways before we can flatter ourselves that the specialty of anesthesia has really been organized.

In a Welfare Session it would seem very *apropos* to discuss the organization of our specialty further.

To begin with no association can thrive without a large membership and the specialty itself cannot be said to be organized unless practically all anesthetists are active members of one or more of the associations.

At the present time some of the associations are not entirely fulfilling their purpose, while other associations should be formed to cover additional territory.

Thus the New York Society of Anesthetists, while it has drawn some members from outside the state, holds its meetings in New York City and to all intents and purposes helps to solve no problems in the specialty of anesthesia, except as they effect its New York City membership. Now this is entirely too curtailed an activity. It would seem to me that the outside members should request the New York Society of Anesthetists to enlarge the scope of its activities. Its membership should be drawn from the entire East and Atlantic Coast States and to accomplish this all its meetings should not be centered in New York City. It could very readily have one or more local meetings, but at the same time, following the policy of the Interstate Anesthetists, it should also hold annual or semi-annual meetings with various State Associations, medical and dental, requesting Joint-Sessions as features of its programs. In this way it would carry its message of organization throughout the entire East.

Having adopted this policy from the very start the Interstate has accomplished considerable in a very short time. At the present moment, however, the Interstate cannot meet the demands of the West for organization and it has been suggested to several prominent Western anesthetists that they organize a Western Association of Anesthetists to meet with the various state or national surgical and dental associations as opportunity presents. Such a Western Association may eventuate during the coming year.

With these three associations, the Eastern, Interstate and Western Association of Anesthetists, in full swing, the country will be adequately covered, although eventually a Southern Association may also have to be formed, which could meet with the Southern Medical Association and state societies. The point to be driven home is that the specialty of anesthesia will only be recognized as such after it has been accepted for Joint-Sessions by the profession and after the public becomes educated regarding its existence.

Apparently, from the foregoing remarks, the American Association of Anesthetists has been disregarded. However my intentions are quite the reverse. The idea is to preserve it, as the national organization and secure in its membership every member of every other Association of Anesthetists. Also it would meet, as is customary in all parts of the country and thus every third or fourth year it would hold a Joint-Meeting with the Eastern, Interstate, Western or Southern Association of Anesthetists, and the A. M. A., the Clinical Congress of Surgeons, the Southern Medical, the Western Surgical or some other important organization. With such a complete organization the specialty would be in a position to achieve distinction and its campaign for recognition and progress would get along very rapidly in all sections of the country.

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* Read during the Fourth Annual Meeting of the Interstate Association of Anesthetists with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., September 25-27, 1918.

All this does not mean that the smaller organizations or clubs of anesthetists cannot accomplish a great deal. Personally I look forward to the day when every large city will have its Anesthetists' Club composed of those in the allied professions of medicine and dentistry who specialize in anesthesia, with an invited membership composed of the surgeons interested in their work. Already certain large cities have been able to establish these clubs and it is interesting to note that cities of the size of Columbus, Ohio, have enough to organize.

These clubs will be extremely important in organizing the specialty in the larger centers, while the other larger associations care for organization in a state or interstate-wide fashion and the A.A.A. looks after nation-wide interests. It is my impression that city organization will solve certain unprofessional activities more quickly than anything alse. It seems a remarkable fact that New York City should support some 60 anesthetists and Philadelphia scarcely any, while in the latter city the non-medical anesthetist flourishes. Invariably there are few if any non-medical anesthetists where there are a sufficiency of expert physicians or dentists to specialize in anesthesia.

It would appear to be a splendid policy then for all of us who are in a position to do so to encourage and participate in the organization of local clubs of anesthetists. These should not be made strictly scientific societies, but semi-professional and semi-social organizations. Meetings at each others homes or certain clubs with one or two papers and a light luncheon would be a very attractive thing. In this intercourse anesthetists would soon learn not to cut each others throats and could readily solve the menace of the non-medical anesthetist by booming the business of those surgeons who took an ethical viewpoint of their employment. Also a great deal of pressure could be brought on hospitals to have them do the right thing by anesthetists and internes.

With regard to these local clubs it must be realized that a new specialist in anesthesia developed in its midst or coming in from the outside, while for a very brief time, he or she may take away some business from the others, his or her expert work will quickly produce just that much more business for the others. This has been found out by experience in every city in which one pioneer began specializing in anesthesia only to make way for at least another specialist every year. I know of cities, now boasting ten or twelve specialists in anesthesia, which ten years ago had none. Also it is more or less up to the local clubs to train those anesthetists who are needed throughout the state as a result of the campaign of education waged by the larger associations. One of the finest things an anesthetist can do for himself and his specially is to bring in some physician or dentist from a smaller town or large rural community having hospital facilities and train him in anesthesia. This sort of fellowship is its own reward, as those who have tried it have found out.

Anesthetists associated with Teaching Hospitals should use the facilities at their command to teach such out-of-town men who wish to specialize. much more may be accomplished by these local clubs in establishing proper education and training in anesthesia in medical schools and teaching hospitals than by any other organizations. They are on the spot, can provide the service and teachers and can formulate policies adaptable to varying conditions. The message to be gleaned from this phase of organization then is just this: Form a local Anesthetists Club. Train enough anesthetists to give every surgeon, specialist and hospital A No. 1 anesthetic service. Train additional men for anesthetic service in the outlying districts; and finally see that proper instruction is given in the local medical schools and teaching hospitals.

Some may say that it would be difficult to get all local men to participate and especially prepare papers. To these I would quote the work of a small society in New York founded by Dr. Gaylord, the cancer specialist. It is sort of an Index and Abstract Club and its members report to the club on certain topics. Thus all of them get the benefit of everybody else's reading. The Supplement and Year-Book and other journals printing articles on anesthesia certainly offer a wealth of material for doing just this thing and many of these articles deserve re-reading and discussion. It is quite possible for such a local club to make its members exceptionally conversant with the world's literature on anesthesia and a club which does this will hold meetings that will very frequently attract their surgical friends. If especially good papers are developed they can be placed on the programs of the larger meetings.

Again these local clubs can and should secure Symposium nights at their local Academies of Medicine for the presentation of papers of interest to all concerned. Anesthetists and surgeons from other parts of the state could be invited to present special papers. There is enough progress latent in one of these local clubs to make your head swim at the very thought of its possibilities.

The Interstate Association grew out of the refusal of one man on the Program Committee of the Ohio State Medical Association to entertain the idea of a Joint-Session for the presentation of papers of anesthetic interest. Since that time the Interstate has been accorded Joint-Sessions with the National Dental Association, a session that eventuated in the formation of a permanent section on Anesthesia in that organization; with the Mississippi Valley Medical and now with the Indiana State Medical Association. These Joint-Sessions cannot help but have their influence in securing the proper recognition of anesthesia as a specialty.

With the Eastern, Interstate, Western, Southern and American Associations all holding Joint-Sessions with other medical, surgical and dental organizations, the campaign for progress will be fairly launched.

While an Official Organ and a Year-Book were dream-children not so many years ago, there remains another dream-child to be given reality—Anesthetic Foundation. Sometime or other, when the good that can be accomplished through such a Foundation has been driven home to somebody with money to back it, there will be established a permanent home for the Specialty of Anesthesia, which will house a circulating library of the world literature and reprints on anesthesia to be loaned to all members of constituent societies. This Foundation will enable the Official Organ to branch out into an independent journal of larger size and increased scope. It will enable the Year-Book to be published without thought of cost or limitations and finally it will provide a laboratory to which most eminent research-workers in the world can be invited to pursue their investigations. These in turn, with noted clinicians will give occasional public courses in the most advanced points of anesthesia, calculated to give the specialists something to interest them even more profoundly than our meetings.

Such a Foundation, would of course be international and would accomplish for the world-at-large what we have been trying to do in a more limited sphere. Stranger things than this have come to pass.

Personally, in closing, I want to express my own appreciation of the cooperation that has been extended me in working out details of what organization has so far been accomplished by those in the various associations, who have been vitally interested in the welfare of the Specialty of Anesthesia. United effort has certainly borne fruit and if only all those who still have the enthusiasm and desire to continue our progress will continue to cooperate there is nothing that cannot be accomplished. Perhaps the greatest solace of my enforced leisure has been the realization that it has been put to a good purpose. My continued disability leaves me in a position in which my desk can be a centralized exchange for anesthetic progress. I only ask that the calls be made frequent. Connections will be made promptly and a willing, cordial, cooperate service maintained.

VAPOR ANESTHESIA FOR ORAL AND FACIAL SURGERY.*

WM. HAMILTON LONG, M. D.
LOUISVILLE, KY.

So great an authority as Gwathmey recently remarked that the vapor mask, or semi-open method of anesthesia, should be used in operations on the head, neck and upper thorax; that the closed method should be employed in abdominal and other operations requiring relaxation. The method and technic described later may be considered an open method, as there is no other than incidental rebreathing.

The accomplishment of a smooth, satisfactory and uninterrupted anesthesia, for prolonged surgical work within the mouth or about the face, is by no means an easy or a simple matter. It is for this reason that doubtless both surgeons and anesthetists have contented themselves with the unsatisfactory technic of an interrupted administration with its delays and its dangers. The latter are at least two-fold, for we know that an anesthesia going from deep to shallow,—an anesthesia in which the procedure is a very profound induction, then withdrawal until the reflexes return, or even until voluntary muscular action is noted; (this to be repeated many times),—is more dangerous than a smooth and continuous maintenance of anesthesia at a given depth. And, also, as a proper aseptic technic cannot be adhered to under an interrupted or intermittently administered anesthesia, the danger of infection is that much increased. Furthermore, if there were no other reason for improvement over the method mentioned, the fact that it is unscientific and a makeshift should be sufficient.

Intratracheal anesthesia, with the complicated apparatus necessary for its employment and the dangers incident to and arising solely from the method, I am free to say, has never impressed me favorably; and in trying to improve my technic for that class of cases in which free access to the inspiratory inlets was denied by virtue of the character of the operation, I searched for apparatus which would be at once simple, compact and satisfactory. I believed that a better understanding of anesthesia by intrapharyngeal insufflation would enable me successfully to anesthetize any patient for operations in which the intratracheal method was especially advocated.

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* Read during the Fourth Annual Meeting of the Interstate Association of Anesthetists in conjunction with the Indiana State Medical Association, Claypool Hotel, Indianapolis, Ind., Sept. 25-27, 1918.

There is, of course, nothing new in any of the simple paraphernalia which is herewith described, and nothing with which the members of this society are not familiar; but inasmuch as the mere fact that smooth, deep anesthesia could be maintained for an indefinite period while surgical work was in progress within the mouth, or about the face or neck, has seemed a revelation to some surgeons for whom I have used the intrapharyngeal method, I thought a brief description of the method might be of interest, and convince some that simplicity and lack of elaborate and complicated equipment are not incompetable with efficiency.

The term vapor anesthesia is inaccurate as any inhalation anesthesia is "vapor anesthesia"; but as the term is used we mean that the agent is vaporized in a closed container at a distance from, and the vapor then conducted to the patient; and by intrapharyngeal vapor anesthesia we simply mean. of course, that the vapor is discharged within the mouth or pharynx whence it is taken into the lungs by normal respiration.

The Hitz bottle, which is merely an improved Junker, and the foot bellows are all the apparatus needed, save, of course various vapor conductors; mouth gag, nasal tubes, pharyngeal tubes, or cheek hooks. There are much more elaborate outfits to be had; there are two and three-bottle vaporizers to be seen with and without heating apparatus attached; and there is an electric motor blower. But I believe the foot-bellows and Hitz bottle are as efficient as any, besides being cheaper and much more portable. One soon learns to control the volume of air with the bellows and the Hitz bottle is so made that all or any portion of the pumped air may be forced through the anesthetic agent. This is its advantage over the original Junker. The bellows may be worked at the same speed and the same volume of air be pumped, while the controller on top of the bottle may be adjusted so that much or little anesthetic vapor is conducted to the patient.

At the "air" or inlet tube of the Hitz bottle I have had a Y made with a stopcock on one arm. A cylinder of oxygen is attached to this for emergency use, or to augment the atmospheric air current from time to time, if cyanosis or other indications for increased oxygenation be observed. Cyanosis is not an uncommon complication as the operative procedures are frequently of a character to mechanically shut off the air way by accumulation of blood, pressure sponging or instrumentation. Such mechanical interference with breathing should not be permitted to become embarrassing.

The Junker type of apparatus is open to the theoretical objection that a "constant vapor" is not maintained. A "drop" or "surface" evaporation type meets this objection, but for the use of the mixture later advocated, I believe the Hitz apparatus the best style.

The constant agitation of the mixture by the air passing through assures the delivery of a vapor in which the proportions are practically the same as in the liquid mixture. There is no fractional evaporation, which may result in a vapor far stronger in chloroform than was intended, or than the fluid mixture represents.

In pharyngeal insufflation, says Coburn, after the patient is deeply anesthetized, the short catheter is passed through the nares into the pharynx and the insufflation begun. The amount of air insufflated need not always be so much as that required in the intratracheal method, but the amount of ether vapor must be the same. The obstruction at the base of the tongue is automatically removed in the pharyngeal method also, but not quite so perfectly as in the intracheal method. While tracheal insufflation has heretofore been extensively used in chest surgery, yet pharyngeal insufflation possesses special advantages for this very work. After the chest cavity is opened, the distension of the lung is under more pliable control with pharyngeal insufflation, as such distension is continuous in the tracheal method and the distended lung is always in the field of operation on account of this distension and thereby interferes with the work of the surgeon, whereas in the pharyngeal method, the lung of the side under operation collapses, thereby facilitating the work of the surgeon. When the operation is completed and the surgeon is ready to tie the last sutures, the collapsed lung is easily and quickly expanded by placing a wet towel over the patient's face. This retards the outflow of air and insufflated air is of such volume that it quickly distends the lung.

For the best results I wish to advocate the use of a chloroform-ether mixture for vapor anesthesia. Induction may be by any method, the nitrous oxid-oxygen-ether sequence being my preference; or in young children the essence of orange-ether sequence; but for maintenance a mixture of chloroform and ether is used. The proportions in most cases are roughly, chloroform one part and ether two parts, but these are varied according to the type of patient, and the chloroform is increased in the mixture in proportion as difficulty in maintenance is anticipated. Chloroform is a more powerful narcotizing agent than is ether, and as we cannot in these cases cover the entire mouth and nose for air exclusion, we find chloroform is the better acting anesthetic for the method. However, reinforcement with ether is essential for its stimulating effect, so that the profound depression of chloroform alone may be counteracted, as a measure of safety.

Clinically and practically a mixture of chloroform and ether, in which chloroform forms from one-third to one-half of the mixture, gives a narcosis which acts like chloroform anesthesia and looks like an ether anesthesia; *i. e.* profuse mucous secretion is not observed, anesthesia of proper depth is more easily maintained; but the color of the patient remains rosy, circulatory depression is not evident, and blood pressure does not become reduced.

This action of chloroform-ether mixture may seem paradoxical to many, and those whose prejudice against chloroform extends to an almost complete elimination of it from their armamentarium argue that I do not and cannot get the advantages of both agents while counteracting the disadvantages of each with the other, and that I am merely subjecting the patient to the dangers of both. I can only reply that observation and experience, which count for more with me than theoretical reasons, merely strengthen my views on the efficiency and safety of chloroform-ether mixture as used for intrapharyngeal vapor insufflation.

For those cleft palate and harelip cases which are operated on very young—under two years of age—chloroform alone is used by this method. The immediate risk is great if we maintain a narcosis throughout of sufficient depth to keep the throat reflexes abolished, yet we should be satisfied with no less perfect an anesthesia. With chloroform, the line between deep anesthesia and fatality is always narrow. An anesthesia which precludes coughing and strangling when the throat contains blood, and the head is kept in a straight position, with the face looking directly upward—thus permitting all saliva, blood and mucus to trickle by gravity to the larynx—is necessarily profound. And in children at the age mentioned at almost any time during such a maintenance an extremely slight increase of chloroform vapor, added when the narcosis is already deep, may swing our anesthesia across the safety-line to a sudden fatality. Thus eternal vigilance is the key to satisfactory anesthesia in these cases.

In my hands this simple method, with its equally simple and readily portable outfit, has displaced all other methods and apparatus for anesthesia in the surgical work to which it is adapted. Hare-lip, cleft palate, excision of the lower jaw, labial epithelioma and similar operative cases are all anesthetized in this way. The pharyngeal tubes and funnel inhaler method have long since been discarded, personally, as never having been entirely satisfactory in my own hands. The intratracheal method I have never routinely adopted, believing that its physical and mechanical dangers are great, and that the pharyngeal method enables me to secure more satisfactory results for the surgeon, patient and anesthetist.

SOME OBSERVATIONS ON THE LIMITATIONS OF NITROUS OXID-OXYGEN ANESTHESIA AND A RESTRAINING DEVICE FOR THE OBSTREPEROUS PATIENT.*

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Aside from the title of this paper, it is safe to say that in ninety-nine and nine-tenths per cent. of cases there are practically no limitations to the use of nitrous oxid-oxygen, where either an anesthetic is indicated or where conditions are such as to necessitate the administration of an anesthetic regardless of existing pathological conditions. The degree of the anesthetist's skill and the condition under which he operates alone create the limitations.

In nitrous oxid-oxygen we have found one of the greatest pain-relieving agencies for the benefit of suffering humanity, and one that can be given under all conditions with the greatest degree of safety, providing it is administered by one who is thoroughly familiar with the technic of its administration. However, it is much to be regretted that up to the present time, out of the large number of practicing dentists who have taken up the use of this form of anesthesia, too few are using it successfully,—due to the fact that insufficient time and study have been devoted to preparation for its application.

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No one would expect to be able to insert a gold filling skillfully or to set up and finish an anatomically articulated denture without having previously given several years of study to the theoretical and practical factors involved in the achievement of such tasks; nor to perform a difficult operation merely upon the directions of the most ideal text-book. In like manner, a successful analgesia or anesthesia cannot be accomplished by reading a general treatise on the subject, witnessing a few practical demonstrations and making half a dozen more or less disappointing attempts at administering these gases; yet this is what is being attempted every day by certain members of the dental profession, too lax to master the intricacies of anesthesia.

Their result spells failure and condemnation of what in reality, as a pain-relieving agent, ought to take the foremost position as a factor in building up a practice. From personal observation we all know that there is no branch of dentistry for which the public manifests a greater degree of appreciation than for that which aids in the elimination of pain, and the man who is proficient in this direction has no difficulty in building up a clientele. I wish, therefore, to impress upon the members of the profession the importance of a complete mastery of the science and art of nitrous oxid-oxygen anesthesia, which will, in return, more than compensate them for the effort involved.

However, granting a high degree of skill on the part of the operator and ideal conditions of administration, there still remain certain limiting factors affecting results in the employment of this anesthetic from the standpoint of the dental practitioner. Diabetic or nephropathic patients may be classed under the head of limitations, as they are apt to fall into diabetic or uremic coma from which recovery is not assured, even after of a short anesthesia lasting only three or four minutes. In hospital service where urinary analysis is practical and available such conditions may be recognized and dealt with accordingly, but in a private dental office a thorough physical diagnosis is impracticable for ordinary exodontia or routine operative dentistry. It is, therefore, advisable for the dentist first to acquire a history of the patient from the family physician, and if a large percentage of sugar or albumen is present, to employ conductive anesthesia in these cases.

Unless the anesthetist has had considerable experience it is unsafe to administer nitrous oxid-oxygen to children under five years, as they readily come out from under its influence, and are prone to sudden asphyxia, unless the anesthetist has sufficient knowledge and presence of mind to use the emergency oxygen valve and artificial respiration. Children are also subject to sudden death under anesthesia from status lymphaticus.

In the class of limitations also should be included such types of patients as chronic alcoholics, dope fiends, and individuals partially or wholly under the influence of alcoholic stimulants. These are, in most cases, difficult to control and to operate on with any degree of accuracy, due to their resistance, muscular rigidity, and a tendency to realism in their dreams and hallucinations, unless a restraining device is employed, or a hypodermic of morphin and scopolamin is given previous to the administration of the anesthetic. Owing to the utter lack of preanesthetic preparation, the average dental practitioner is obliged, so to speak, to snatch his patients right off the street, and it frequently occurs that patients will follow the old-time layman's course of preparation by imbibing two or three good high-balls so as to instill a little courage into their system previous to an exodontia operation. These are the patients who give events an unexpected turn, unless the anesthetist is fully prepared with trained assistants and a reliable restraining device. If conditions are detected early enough it is perhaps wise to discharge the patient for the time and have him return the next day in better form.

Having admitted that nitrous oxid-oxygen has certain limitations, it would seem appropriate, in connection with this subject, to consider the addition or the substitution of other methods of anesthesia. Not all cases being of one pattern we cannot depend upon a single agent for universal application. The human factor must always be taken into account, and each individual case must be carefully studied, before deciding upon the method to be followed.

In prolonged dental operations, such as impactions of third molars, impacted roots requiring time and accuracy, or extraction of twenty to thirty teeth at one sitting, where the operator lacks the desired team-work of trained assistants and ideal office facilities, and where the patient is not of the extreme apprehensive type, great advantage may be gained by the use of conductive anesthesia. This may be employed in such cases for the entire operation, or simply to complete the preliminary operative measures,—the remainder of the work to be done under nitrous oxid-oxygen.

This method of combined anesthesia has the advantage of avoiding prolonged general anesthesia for minor details, thereby assuring a more rapid recovery, gives the operator a clearer vision of the field of operation in the oral cavity, eliminates excessive hemorrhage during the operative period, avoids the gagging and swallowing of blood incidental to a general anesthesia, and prevents immediate postoperative pain. Furthermore, in conductive anesthesia, either alone or followed by nitrous oxid-oxygen, we have the possibility of ideal results through a combination with novocain-supraremin, in the reduction or elimination of shock. Nitrous oxid-oxygen eliminates the shock of the conscious mind during the major portion of the operation, while the novocain-suprarenin eliminates the shock to the nerve centers usually caused by the traumatic injury.

There are many incidental factors which account for many failures in nitrous oxid-oxygen anesthesia. In some dental offices there is an absence of any proper system of arrangement, particularly with regard to the psychic effect upon the patient. The waiting room is commonly in close proximity to the operating room, so that any disturbing action or noise from the latter, due to hysteria and hallucinations, is conveyed directly to those waiting for the coming ordeal, creating an unfavorable and a lasting impression, producing a dread and a resistance very unfavorable for the successful administration of the anesthetic. The sight of an occasional, nauseated patient or of the actions of a resisting one, accompanied by the presence of blood and the mess of surgical procedure, are impressions passed on by patients to some new friend or neighbor, aggravating the very psychological condition we are striving to correct.

In addition, as a causative factor of apprehension, there are, in some dental offices, repulsive surgical features, such as pictures of dissecting rooms with partially dissected cadavers lying upon the slabs, surrounded by a number of students clad in their white gowns, and, to complete the decorative scheme, two or three human skulls distributed about the room, objects giving more the appearance of a medical school ampitheatre than of a cozy, home-like waiting room, all have a tendency to create a state of mind unfavorable for a successful anesthesia. In the operating room, likewise, all display of instruments and other armamentarium should be avoided. Gas cylinders should be kept in a separate room. and the gas and oxygen piped into the operating room; the gas apparatus and dental engine, should be concealed in cabinets and not brought into view until the patient is anesthetized. In short, the office should not be a dental and medical exhibit, but rather should present, as much as possible, a home-like environment, thereby inducing in the patient a quiet, restful and relaxed frame of mind.

To the above considerations might be added tidiness of the office, operator and assistants, and the ability to inspire the patient with confidence, by a care-free and cheerful manner, and by reassuring conversation as to the absence of danger, unpleasant sensations, failure to recover, and possibility of pain. The prime requisite for producing this psychological effect is that the operator must have the utmost confidence in himself and in the anesthetic. The patient, during these trying moments, can very readily sense any sign of weakness or want of confidence on the part of the operator.

So while the efficiency and safety of gas-oxygen is practically unlimited, when administered under unfavorable conditions its limitations may become unlimited.

Now as to the obstreperous patient. It is a fact well known to everyone using nitrous oxid-oxygen extensively, that some patients when under the influence of this anesthetic, will at times threaten to clean up the shop while laboring under some hallucination such as becoming involved in an imaginary argument or fight, thereby rendering operating extremely difficult and at times almost impossible even for the professional anesthetist. The effect upon the novice of such an experience is very discouraging. He is likely to join in the condemnation of nitrous oxid-oxygen, push his gas apparatus aside to become dust-covered, discourage his patients from enjoying the blessings of anesthesia, and go on extracting teeth in the same old way as his ancestors did.

Realizing these conditions and also admitting that I may have been somewhat deficient in mastering these difficult cases, I have recently devised a restraining apparatus for the obstreperous type of patients.

This device consists of a wide stiff leather apron to which two straps are attached on either side extending around the back of the dental chair and there connected by means of a buckle; this prevents one frequent source of trouble, namely the patient sliding out of the chair, which in the rigid condition of the patient (providing the operator is accustomed to work with patient in an upright position, frequently consumes a great amount of valuable time, thereby prolonging the period of anesthesia unnecessarily. The rigidity and extreme width of the apron distributes the pressure uniformly and widely over the abdomen and chest thereby preventing too much pressure upon the diaphragm and avoiding interference with free respiration.

Secondly, I have attached to the device a pair of padded leather cuffs connected to the straps by means of a metal staple, so arranged as to slide back and forth on the straps, and adjustable to patients of various build and size. These prevent the patient from interfering with the operator by unconsciously swinging the hands and arms around or grasping the inhaler.

The cuffs are equipped with a brass post extending through the holes in the cuff-band punched a short distance apart so as to fit snugly to wrists of varying circumferences and locking by a small metal bar the same as used in locking doors from the inside.

This device can be quickly and noiselessly attached either before the anesthetic is begun or after the patient is partly anesthetized, being slipped in under the linen apron with which the clothing of the patient is protected against blood stains.

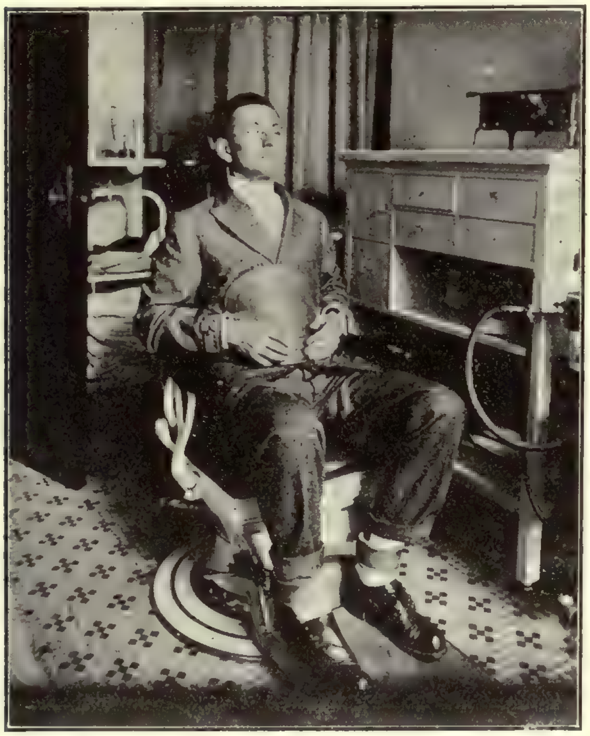

Fig. 1. Demonstrating Application of the Restraining Device.

In case of patients whose work calls for especial accuracy or prolonged anesthesia, manifesting a tendency towards uncontrolability, I also use a pair of anklets attached to the foot rest of the chair by means of snaps. These in turn are permanently fastened to the chair with a leather strap slipped through a bracket bolted to the side of the chair. It is rarely necessary to use this.

I do recall one instance in which a big, powerful fellow raised both lower limbs high into the air, bringing them down with such force as to break the castings on both sides of the foot rest near the base of the chair, necessitating considerable expense in repairing the same.

The criticism and argument against this method of procedure no doubt will be the psychological effect upon the patient's mind, as causing increased apprehension.

Even though this may be an undisputed fact to a certain degree, I can truthfully state that I have employed this method in several hundred cases and so far have had only one patient who showed any symptoms of fear. In fact I have reached the point where I never undertake an exodontia operation on a man of any considerable physical strength without it. You may only have resistance in a small per cent. of the cases presenting, but you never can tell when it is going to occur. Even if the device may excite the apprehension of few patients, that is preferable to taking chances of having furnishings broken or of accidentally injuring an adjacent tooth or bridge through some unexpected move of the patient, thereby rendering oneself liable to a malpractice suit.

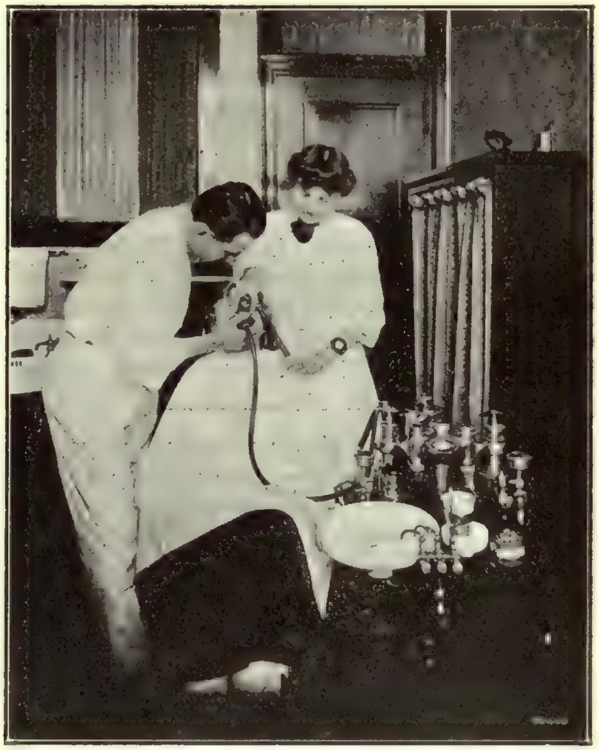

Fig. 2. Administering the Anesthetic.

This method of restraint is advocated only for extraction of teeth and is not necessarily to be used in all cases. A certain amount of tact and diplomacy must also be employed in order to dispel any apprehension the patient may manifest towards these measures of restraint.

In conclusion I would again point out a few of the harmful factors which account for some of the failures in nitrous oxid-oxygen anesthesia. Unpleasant sights, such as waste, unclean linen, blood, and instruments; disturbing noises without and within the operating room, such as passing vehicles or banging doors; deficiencies in the operator's dress or deportment; neglect in properly loosing the patient's clothing or seating them comfortably, and many other seemingly trifling details may have a psychic influence fatal to the operator's success. A thorough knowledge of the physiology and pharmacology of nitrous oxid-oxygen anesthesia and analgesia; judicious consideration of the patient's individual requirements and peculiarities,—pulse, respiration, color, and physical characteristics; a reliable and thoroughtly practical apparatus and intimate familiarity with its working possibilities; a correct gauging of the patient's lung capacity instead of blind reliance upon an average percentage; placing the patient's body according to the requirements of the operation; proper adjustment of the inhaler; intimate familiarity with and correct interpretation of symptoms,—all are prime requisites for success.

FIRST NATIONAL BANK BLDG.

RELATION OF PULSE PRESSURE AND KIDNEY FUNCTION TO OPERATIVE PROGNOSIS*

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During the past two years, at the Long Island College Hospital, we have made an attempt to determine the *clinical value of preoperative pulse pressure* and its relation to kidney function in the operative prognosis of gynecologic patients. This study has been carried out along with our routine preoperative and postoperative blood pressure and blood studies, the preliminary report of which has already been presented to the American Gynecological Society at its 1917 meeting and published in their transactions. The conclusions of this former study will be given at the close of this brief discussion.

In order to make these determinations, the *following preoperative routine has been adopted*: On admission *the cardiac force* of each patient is studied in the following manner: The systolic and diastolic pressure is taken with the patient in the recumbent position, and the pulse pressure noted as *at rest.* The patient is then seated on a stool and instructed to raise the arms and extend and flex the forearms for two minutes, when the systolic and diastolic pressures are again taken and the pulse pressure noted and recorded, as *after moderate exercise.* Finally the patient is made to stand up with the legs spread apart and a pound weight lying between the feet, when she is directed to raise the weight up over her head, then lower it between her legs again, then raise it again, first ten times, then twenty times. The *rate of the heart action is, of course, accelerated* and the *systolic pressure raised,* but if the *heart muscle is of good quality little or no change is noted in the pulse pressure.*

The value of such a test is at once apparent in estimating the quality of the cardiac muscle, especially in those women who have been ill with infective diseases for a long time.

We next make a preoperative estimation of the *sulphophenolphthalein output of each patient, to estimate the renal function.* We have found that, *averaging the normal pulse pressure at 35 millimeters, the "phthalein" output for two hours, in the normal case, averages about 60 per cent.* Where the *pulse pressure is high, say 60 or 70 millimeters,* the *"phthalein" reading will be either high or low, depending on the state of the kidney structures.* When the *reading is low, the pulse pressure has to be relatively high to compensate for the diminished renal function.* On the other hand, when the "phthalein" reading is low, say 20 *or* 30 *per cent. in two hours,* and the *pulse pressure also low, the patient has proven to be a poor operative risk and the cardiac muscle is always questionable.* These patients have given us trouble in their postoperative course.

Our only fatal case, of postoperative cardiac dilatation, showed a preoperative pulse pressure of 24 and a "phthalein" output of only 29 per cent. Under ether stimulation and the Trendelenburg posture, the pulse pressure was maintained throughout the entire operation at 30 millimeters, but promptly on her return to bed and after the effect of the ether had worn off, the pressure dropped to 20 millimeters, and resisted all known methods to raise it. The patient died five and one-half hours after coming from the operating room.

Such an experience led us to make a further study of the effect of ether on renal function as shown by the phenolsulphonephthalein output.

Our routine has been, for several years, to watch the pulse pressure during anesthesia and to take the systolic and diastolic pressures *immediately at the close of every operation,* while the patient was still under ether stimulation, *again in six hours* and *again in twenty-four hours,* and a record of the *pulse rate every fifteen minutes for the first six hours.* In shock or hemorrhage the pressure is taken every hour until reaction has taken place. A complete blood count and hemoglobin estimation is also made immediately on the return of the patient from the operating room. This *gives us a control for comparison with pressures and counts,* should complications occur in the subsequent postoperative course. *No step in our routine has been of more clinical value than this detail,* as by it alone and in conjunction with blood pressure readings, we have been able to differentiate between hemorrhage shock and postoperative cardiac dilatation.

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*Read at the joint meeting of the Interstate Association of Anesthetists and the Indiana State Medical Association at Indianapolis, Sept. 26, 1918.

Six hours after operation the first "phthalein" estimation is made of the kidney function. A catheter is left in place for two hours and the readings made from the collected urine. So far in our work *one interesting observation has been noted, namely, that notwithstanding the diminished urinary output which always follows the administrati of ether in the first few hours, there is only a negligible change, usually not over* 10 *per cent. in the "phthalein" eliminated, provided the pulse pressure has remained normal.*

But three exceptions to this constant observation have been noted, *one a nephrectomy for a large cystic kidney where* the *immediate effect* of *removal of the kidney was to reduce the "phthalein" output from* 85 *per cent. preoperative to* 29 *per cent. postoperative,* yet within thirty hours the output had increased to 65 per cent.

Another exception was a myomectomy in which there was considerable blood loss during the operation with a consequent fall in pulse pressure a half grain of morphin was used during the last half of the operation while the administration of ether was suspended. The operation was followed by severe shock, the blood pressure fell to 78 over 55 millimeters, and remained so for several hours. The urinary output in the first twenty-four hours was 4 *ounces* and the "phthalein" elimination only 20 per cent. It took seventy-two hours before the urinary output and kidney function approached the preoperative record. This is a good illustration of the relation of pulse pressure to kidney function.

A third case, which shows a marked discrepancy between preoperative and postoperative readings, was that of a woman with a large subvesical myoma, who was subjected to a total hysterectomy. Her hemoglobin on admission was only 40 per cent. The systolic pressure 150 over a diastolic of 110 millimeters. This patient showed a preoperative functional "phthalein" of 65 per cent. after twenty-four hours of preoperative rest. She had a light ether anesthesia of nearly an hour, supplemented by a half grain of morphin during the operation. She left the operating table with a pulse of 80 of good quality and a pressure of 155 over 115 millimeters. Her "phthalein" at the end of six hours was 20 per cent. and only 10 ounces of urine was secreted in the first twenty-four hours. This increased to 26 ounces in the second twenty-four hours as did her "phthalein" which rose to 40 per cent.

These two instances suggest to us that while *morphin definitely minimizes the shock* and *may be used to advantage* when *the patient is fully anesthetized to complete the operation without the further administration of ether,* it has the effect of diminishing the urinary output in the first few hours after operation.

In the second case, the low pressures may have had a direct bearing on the kidney output, but in the last the pressure remained constant and cannot be credited with inhibiting kidney function, nor in this case was there any blood loss or shock, hence I feel that it is fair to conclude that the diminished output was directly due to morphin.

From this short study, which now includes more than 200 consecutive abdominal cases, we feel justified in drawing the following conclusions:

1. That the *pulse pressure is a test of the muscular strength* of the *individual woman's heart,* when endocardial lesions can be excluded.

2. That the *efficiency of the kidney function is directly dependent on the cardiac force of the individual, provided the kidney structures are normal or approximate the normal.*

3. That *ether anesthesia of an hour does not disturb the relation of pulse pressure to kidney function unless the operation is accompanied by considerable blood loss.*

4. That when *the preoperative kidney function is low* the *pulse pressure must be relatively high to compensate for the deficiency,* as it does *no good to add saline by skin or bowel or infusion unless there is sufficient cardiac* strength to take it up and carry it along.

5. That *when both the pulse pressure and "phthalein" output are low the operative prognosis should be guarded.*

6. That *morphin in large doses during operation seems to help in diminishing the shock* but has a definite effect in diminishing the kidney output.

CESAREAN SECTION AND OBSTETRIC OPERATIONS UNDER NITROUS OXID-OXYGEN ANESTHESIA.*

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The more frequent use of anesthetics in obstetrics while affording surgical relief for dystocia, the correction of malposition by art, and the repair of injuries to the soft parts, has in recent years stimulated a search for a more ideal and flexible narcotic agent in this field.

Although still widely used, chloroform is recognized as a more dangerous drug than was formerly supposed. Even in the small ineffective doses ordinarily employed in obstetrics, it is under suspicion; while for anesthesia in the toxemias of pregnancy it is openly contraindicated.

Ten years ago, after having become fairly familiar with the action and use of nitrous oxid and oxygen in surgery, I adopted it for obstetrical operations and have used it almost exclusively since. For the past seven years, since Guedel of Indianapolis personally called my attention to its possibilities in analgesia, I have used it extensively in obstetrics for this purpose as well. While it is not my intention to deal with statistics in relation to maternal and fetal mortality and morbidity referable to anesthesia, a subject for a future report, it may be briefly stated that I have had no death in mother or child which was unexpected or in which the anesthesia *per se* has been regarded as a possible cause.

Although the first anesthetic to be discovered, there is still more or less widespread ignorance and misconception of its application and effects in both the dental and medical professions. This is possibly most noticeable in obstetrics.

Operative obstetrics presents differences in anesthesia and surgical technic from the usual surgical operation which are too frequently ignored. There is more than the mother's general condition to be thought about during her anesthesia; there is the mother in a general sense, the uterus and passage in particular, as well as the fetus. Ether for this work cannot be administered *ad libitum* as is sometimes done in a surgical clinic. Such treatment does not fit into obstetrical requirements, but leaves the uterus incapable of further immediate labor should such be desired; and the reaction of the child, if born under profound ether, is often sluggish if breathing begins at all.

These points are familiar to all, but are repeated here because we have seen the parturient treated as a purly surgical case with disastrous results.

Those anesthetists who have seen only the true operative case in obstetrics such as cesarean section, have missed the many obstetrical maneuvers in which the transient anesthesia of nitrous oxid-oxygen aids the art which so often avoids surgery and relieves the mother of much pain and shock.

The mother may be anesthetized for a rotation of an occiput posterior or a version and within two minutes after removing the inhaler she is awake and resuming labor. How is this difference between chloroform or ether and gas-oxygen brought about? Principally by the relatively complete and extremely rapid absorption and elimination of gas-oxygen.

When chloroform or ether reaches the tissues its marked affinity for the fats and fat-like substances of the cell binds it there, making its effects long continued after the inhalation has been discontinued. Moreover, even in light concentrations the vapor is taken up and accumulates sufficiently if inhaled over a considerable period, to inhibit the uterine contractions and in many instances brings labor to a standstill for some time.

Since nitrous oxid is *insoluble* in fats but is exceedingly soluble in blood serum—the normal medium of exchange for oxygen, CO_2, nitrogen, foods, etc.—it has no accumulative action or affinity for tissues by which it might be retained in the body. Therefore, its elimination is quite complete within two minutes.

Even quicker is its absorption. The patient rarely remembers after the sixth inhalation while the relief of the pain of a normal second stage uterine contraction is regularly and conveniently accomplished by three inhalations without interrupting the conscious state. In fact, it would be quite possible to anesthetize a patient during each uterine contraction and have a conscious woman by the time the next "pain" is due. This would be a poor technic in the normal labor, however, since little or no cooperation and straining would be carried out, as she does when in analgesa with consciousness retained.

Many noted obstetricians who have been accustomed to use nitrous oxid and oxygen analgesia have not employed it for complete anesthesia. In many instances, I believe, gas-oxygen has not been selected for obstetrical operations because of erroneous impressions and views gained from older writers and misinterpretation of the mechanism of its anesthesia.

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*Read at the joint meeting of the Interstate Association of Anesthetists and the Indiana State Medical Association, at Indianapolis, Sept. 26, 1918.

One of these mistakes is the impression that nitrous oxid-oxygen anesthesia increases blood pressure. A sphygmomanometer used as a routine during operations, as I have done for twelve years, will demonstrate the fact that nitrous oxid-oxygen does *not* increase blood pressure and is not contraindicated in any case of arteriosclerosis, eclampsia, nephritis, brain tumor, etc., as has so often been repeated from one author to another until the literature is permeated with the error.

Another is the false impression based upon the old and exploded asphyxia theory, that nitrous oxid and oxygen will cause a "blue baby."

Nitrous oxid is a true specific anesthetic and may always be administered in obstetrics with sufficient oxygen to prevent cyanotic babies as effectively as if no anesthetic at all were given. It must not be forgotten that blue babies sometimes occur when no drug or anesthetic has been administered, and while cyanosis in these might not always be prevented, they might be effectively oxygenated while circulation in the cord continues, if oxygen is at hand to administer to the mother at the right time.

While the cord pulsates after delivery, it should not be clamped, but the mother should inhale pure oxygen until the baby cries. I have found that this procedure has largely eliminated apnea in the baby and promotes a very prompt, vigorous cry, bringing immediate relief of mind to the obstetrician.

Whether the crusade against vaginal examinations, if followed out, will benefit the parturient generally by lessening infection in a contaminated field, or implies that the physician is unable to diagnose position, mechanism, etc., when he *does* examine, is far from clear. The important fact is, that mistakes in diagnosis of the situation in the birth canal delays the institution of proper treatment if applied at all before the fetus is dead, or the mother reduced to a state of invalidism.

How many times a cesarean section found to be necessary after the mother has exhausted herself, traumatized her pelvic tissues and lost the baby? Can the kind of anesthesia then employed be blamed for the dead baby, a post-partum hemorrhage or a puerperal fever? No, but it may be a contributing or even a deciding factor in some cases of this kind.

It has been argued by some that nitrous oxid-oxygen does not relax muscle sufficiently.

Sufficient relaxation for hysterectomy, gall bladder, stomach, or any other operation is being accomplished, not only in my work, but by many other anesthetists without the addition of ether. Moreover, one of the important things in obstetrical operations is the maintenance of muscular tone by employing as light an anesthesia as possible (without permitting movements). In abdominal cesarean section, for example, once the uterus is emptied, the abdominal walls are lax and cause no difficulty in closing under extremely light narcosis.

It is also well to bear in mind that anesthesia administered to full muscular relaxation not only reduces muscular tone in the abdominal and other skeletal muscle but similarly affects all kinds of muscle in the body, be it uterus, heart, blood vessel or intestine.

Each shows its peculiar effect. If uterus, relaxation and hemorrhage; if heart, inefficient circulation; if blood vessel, lowered blood pressure; if intestine, flatus and adynamic ileus may result. The fact that extreme muscular relaxation, which causes the above pathologic changes is very difficult to obtain with nitrous oxid and oxygen, shields the mother from these phenomena, which are sometimes combined in the same patient.

If there is an ideal anesthetic for obstetrical operations nitrous oxid and oxygen is this agent.

Its transient effect, when removed, permits almost immediate resumption of normal labor; its lack of depression on uterine and other muscle when properly administered; its safety to mother and child; the means at hand for perfusing the child with oxygen through the mother while the cord pulsates.

The hope of reduction of morbidity and mortality in obstetrics, which is still appalling as compared with other advances in medicine, rests much more on the disposition of the midwife who delivers 50 per cent of the parturients in the larger cities. Medicine faces a problem here of vast economic importance to the public, which is singularly parallel to the problem of professional anesthesia.

2233 Ashland Ave.

AN INSTRUCTIVE AND INTERESTING PROGRAM IS IN THE MAKING FOR THE FIFTH ANNUAL MEETING OF THE INTERSTATE ANESTHETISTS WITH THE AMERICAN ASSOCIATION OF GYNECOLOGISTS AND OBSTETRICIANS TO BE HELD IN CINCINNATI, OHIO, SEPTEMBER 15-17, AT THE HOTEL GIBSON. IF YOU HAVE A PAPER YOU WISH TO PRESENT GET IN TOUCH WITH THE SECRETARY AT ONCE SO THAT IT CAN BE SCHEDULED. DON'T HESITATE TO GIVE THE INTERSTATE THE BENEFIT OF YOUR EXPERIENCES AND RESEARCHES.

A SPECIAL EFFORT WILL BE MADE TO HOLD AN OUTSTANDING SECTION ON ANESTHESIA FOR ORAL SURGERY AND DENTISTRY, AND INTERESTED SURGEONS, DENTISTS AND ANESTHETISTS ARE CORDIALLY INVITED TO ATTEND AND FIND OUT HOW THE INTERSTATE MEETS THEIR NEEDS FOR PROGRESS.

THE ANNUAL DINNER WILL BE SERVED AT THE HOTEL GIBSON, AND AS USUAL WILL BE AN INFORMAL BUT VERY ENJOYABLE AFFAIR. THE LADIES WILL BE DELIGHTFULLY ENTERTAINED SO MAKE PLANS TO BRING THEM TO THE MEETING WITH YOU.

BRING IN AT LEAST ONE NEW MEMBER. FOR FURTHER INFORMATION ADDRESS F. H. McMECHAN, M.D., SECRETARY, AVON LAKE, OHIO.

THE ACID-BASE REGULATORY MECHANISM IN ANESTHESIA.*

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Acidosis does not play a part either in the preoperative or postoperative history of the *average* surgical patient, but there is always an increase in the amounts of acid substances formed during the period and as a result of anesthesia. To make this clear, it is necessary to define the sense in which this word *acidosis* is used. Normally there are continuously formed in the body certain quantities of acids as a result of metabolic chemical activities. These acids are promptly neutralized by alkali which the body keeps available for this purpose. When, however, the amount of acid is increased through any cause, and when the reserve supply of alkali has been depleted, symptoms are produced. Ordinarily, the reserve is amply sufficient to neutralize a quite decided increase in acids, but there are occasions when it fails. This is the sense in which we use the term *acidosis*. To express it in another way, *acidosis means insufficient alkali*. An excessive production of acids which is neutralized and does not drain the body of alkali below a certain point, we prefer to call *compensated acidosis* as suggested by Van Slyke and Cullen.[1] *Uncompensated acidosis* is the condition in which the bodily supply of alkali has been depleted to a point where symptoms occur. In anesthesia, therefore, there results a compensated acidosis in *most* patients; that is, in from 30 to 85 per cent. of the run of operative cases; and an uncompensated acidosis results in from 15 to 20 per cent. of the cases.

STUDIES IN ACIDOSIS

Before analytic data had been gathered, even before analytic methods had been perfected, a number of surgeons had assigned a very important rôle to acidosis in surgery. They claimed that it occurred quite regularly after anesthesia, and was an important factor in producing postoperative nausea and vomiting, gas pains, headaches, restlessness, sleeplessness, and general discomfort. Graver disturbances and even death were laid to this condition. The analytic data which have shown the facts in the case, have been secured mostly by estimates of the amount of bicarbonate in the blood plasma. In normal individuals, from 60 to 75 cc. of carbon dioxid are yielded per 100 cc. of plasma. The carbon dioxid is derived practically entirely from bicarbonate. When there is an increased amount of acid, an equivalent increased amount of bicarbonate will be neutralized, and there will, of course, be a smaller quantity of carbon dioxid revealed by analysis. The reduction in the bicarbonate which has been found to occur after anesthesia and operation, averages from 5 to 15 cc. of carbon dioxid per 100 cc. of plasma. With the normal of from 60 to 75 cc., this decrease in the large majority of cases does not reduce the carbon dioxid to below 50 cc. This latter figure may be accepted as the lower limit of compensated acidosis, and above that figure, no symptoms of acidosis will occur.

A reduction in the bicarbonate of the blood has been interpreted in all other countries to an increase in acids. In the case of anesthesia, however, an interpretation contrary to this has been suggested.[2] It is stated that the carbon dioxid of the blood is reduced after ether anesthesia by the blowing off of an excessive amount of carbon dioxid through the increased rate and depth of respiration which occurs during anesthesia. With reduction in carbon dioxid or carbonic acid from increased ventilation, the alkali of the blood would be relatively increased. From recent experiments, it appears that an increased alkalinity of the blood is tolerated as poorly as increased acidity.[3] Therefore sufficient alkali leaves the blood for the tissues. In other words, there is a shift of alkali from plasma to cells.[2]

This interpretation therefore states, there is no increase of acids during anesthesia. We shall show that it is at variance with numerous analytic data.

ROLE OF THE KETONES.

Among the earliest record of analyses of acids formed during anesthesia are those of Reicher.[4] He found, in 1908, an increase in the amounts of ketone bodies, that is, acetone, diacetic acid, and B-hydroxybutyric acid, in the urine after anesthesia. This observation has been repeatedly confirmed by others and ourselves.[5 6 7] Direct evidence that these ketones are increased in the blood after anesthesia is also afforded by direct analyses.[8] Further, we have computed, that, on the average, 60 per cent. of the observed fall in carbon dioxid of the plasma is accounted for, molecule for molecule, by these ketonic acids, estimated as acetone.[8] Definite evidence therefore exists of an increase in the blood of at least one series of organic acids. The cause of a large part of the decrease in bicarbonate is therefore demonstrated. Ketones are well-known products of partial or incomplete oxida-

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* Read during the Seventh Annual Meeting of the American Association of Anesthetists, Hotel Breakers, Atlantic City, N. J., June 9-10, 1919. From the Department of Pathology of the Lankenau Hospital and the University of Pennsylvania, Philadelphia, Pa.

tion. It has been repeatedly shown in experiments which need not be cited here, that oxidation is diminished during anesthesia.[9] It seems highly probable that other as yet unidentified acids of partial oxidation are also produced in excess. The sum total of these acids, it is evident, will determine the amount of alkali which will be withdrawn from the available quantity in the body.

We have said that oxidation is diminished during anesthesia, having as a basis for this statement many reported experiments. Since suboxidation is the important, if not the only cause of the formation of acids during anesthesia, the prevention of these acids must be directed toward the cause of the diminished oxidation. From these same experiments and others, it can be definitely stated that *oxidation is diminished somewhere between the oxygen in the blood and the oxidizable substances in the cell. Further, interference with oxidation is so intimately associated with the anesthetic agent, that to prevent suboxidation is to prevent anesthesia. Therefore, to prevent excess acid formation is to prevent anesthesia. The protection of the patient against acidosis must therefore reside in supplying the body with alkali.* When acids resulting from anesthesia are then formed, a sufficient amount of alkali will be available to neutralize them and keep the acidosis a compensated one.

Chart No. 1.

Blood CO_2 Cc. per 100 Cc.		Blood Ketones Mgms. per 100 Cc.		Differences		Theoretical Decrease in CO_2	Per Cent. Decrease From Ketones
Before	After	Before	After	CO_2	Ketones		
73.3	59.9	37.7	45.5	13.4	7.8	2.8	21
56.6	47.3	6.8	11.4	9.2	4.6	1.7	18
74.0	51.3	45.8	52.0	22.7	6.2	2.3	10
42.0	28.1	103.7	185.6	13.9	81.9	31.6	228
66.2	54.8	22.0	46.7	11.4	24.7	9.4	82

NEUTRALIZATION OF ACIDS.

A word as to the mechanism by which the body provides for the neutralization of the acids formed during anesthesia is now in place. They are treated in the same way that mild excesses of acids are treated in any other condition. We soon found that sufficient acids were produced in some cases to neutralize the entire bicarbonate of the blood.

This of course is not possible in life. *Further studies confirmed what had been demonstrated before, that the ammonia and titrable acidity of the urine were increased after anesthesia. To put it briefly, these acids are neutralized as they are formed by sodium bicarbonate and ammonia, and then probably, for we have only begun these analyses, by other available but less easily mobilized bases such as calcium, and magnesium. The salts of the acids are then excreted and thus eliminated from the body.*

SYMPTOMS OF ACIDOSIS.

The question now arises—what symptoms does acidosis of itself produce? The answer to this is clouded by the fact that an uncompensated acidosis is practically always an accompaniment of some grave pathological condition. For example, in nephritis an acidosis developes, but only in grave forms of the disease, and it is difficult to estimate the relative significance which should be attached to the acidosis and to the other conditions produced confidently. In diabetes mellitus, where this condition appears frequently enough, a trifle clearer picture can be obtained. In lower organisms and isolated cells the reaction to changes in acidity are quite sharp. All pathogenic bacteria require culture media of a definite reaction for their optimum development. The meningococcus can be easily inhibited or killed by what seem very small changes in the reaction of the medium on which it is growing. We have often observed the difference in behavior of gold fish in an aquarium, when the water was alternately made very slightly acid and very slightly alkaline. *It can with safety be said that the symptoms which acidosis of itself will produce will vary according to the degree of the condition, from mild headache and general mental dullness, to coma and death. We shall not attempt to state dogmatically in our 15 per cent. of cases who showed acidosis, what symptoms were due to that codntion, but we can state decisively, that these patients suffered more nausea and vomiting, more headache, more gas pains, and took a longer time to recuperate than did the others who showed compensated acidosis.* These comparisons, we realize, are difficult to make critically, on account of differences in individuals, in the pathology and the operative treatment. We cannot help feeling, however, that acidosis *per se* did play a part in their unfavorable postoperative symptomology; for plenty of water with alkali led to remarkably favorable change in the picture of quite a few. It remains to examine the particular cases in whom this uncompensated acidosis occurred, and to determine in what individuals and under what conditions it occurred.

DETERMINING FACTORS OF UNCOMPENSATED ACIDOSIS.

Sex adds no particular determining factor, nor apparently does age, except possibly in the extremes. *Impaired kidney function, as would be expected, was definitely a factor.* Here there is not only the failure of excretion of acid substances, but also the possible retention of other acids not resulting directly from anesthesia. *Patients with diseases which drained the body of reserve alkali before operation, always showed large diminution in carbon dioxid,* for example, severe, long continued infectious processes, in which fever with its incerased metabolism had caused excess acidity. *The duration of anesthesia was a factor.* The longer suboxidation is allowed to proceed, the greater is the demand for reserve alkali. The deeper the anesthesia, that is, the more cells anesthetized, and the deeper they are anesthetized, the greater will be the quantity of acids produced. Preoperative preparation played its part. For example, many patients were admitted with a spreading peritonitis following appendicitis, cholecystitis, and similar acute infectious processes, and these were usually allowed to remain unoperated until the peritonitis had become more or less localized. During this period among other things, they were given no food. This in itself, tended toward acidosis. *Hemorhage has been found to reduce reserve alkali.*[10] While none of our patients were actually shocked, several showed immediate symptoms which might be referred to such a condition in a mild degree. These patients all showed more than the average diminution in bicarbonate. Results in France indicated to those investigators,[11] that *in a condition of shock there is uncompensated acidosis.* This is, of course, to be expected, for oxidation is surely interfered with in this condition. Finally, and of great importance, *those patients who show a low reserve before operation will always show a greater diminution after operation.*

CHART No. 2

Blood CO_2 Cc. per 100 Cc.		Blood Ketones Mgms. per 100 Cc.		Differences		Theoretical Decrease in CO_2
Before	After	Before	After	CO_2	Ketones	
74.0	51.3	46.4	301.8	22.7	255.4	98.5

THE MANAGEMENT OF ACIDOSIS.

The management of operative cases from the standpoint of acidosis is fairly simple in the light of these investigations. The interpretation that the reduction in plasma bicarbonate is due to overventilation of the lungs, and not to acids, has been discussed for reasons which are clear. The decision between the two is fundamental. It has been recommended that carbon dioxid be given with the anesthetic to make up from outside sources the carbon dioxid of inside metabolic origin, which has been lost in excess through too rapid and too deep respiration.[2] It is unnecessary to discuss here, whether the respiratory centre is stimulated by the H-ion concentration of the blood alone, or by that factor and carbon dioxid as a specific stimulant in addition to its property as an acid.[12] Suffice it to say, that the acidity of the blood is a factor in keeping the respiratory center in activity. If the carbon dioxid of the blood be diminished through excessive ventilation, and did the blood become more alkaline as a result, this normal stimulus would be diminished, and the patient stop breathing. Then it would be logical to give carbon dioxid to keep the acidity up to a given stimulating point. Since, however, other acids are formed in the body, and in excess, this treatment is not only illogical, but actually harmful. Under these circumstances, since carbon dioxid is an acid, insult would be done to injury by adding just so much more acid to that already formed.

SUMMARY.

The much discussed subject of acidosis in surgery has been investigated, and by a correlation of results of various analytic data, the following statements can be definitely made.

There is an increase of acids in every patient anesthetized by ether, chloroform, and nitrous oxid. Intraspinal anesthesia by stovaine produced quite a marked increase in acids in one case which has come under our observation. This increase does not reach a stage where true acidosis is produced in 80 per cent. of cases. In 15 to 20 per cent. of cases it does.[18]

Estimations of the bicarbonate content of the blood plasma give information of acidosis in anesthesia as well as in other conditions.

The conditons under which acidosis in anesthesia will appear have been mentioned.

CONCLUSIONS.

It is recommended that estimations of the bicarbonate content of the blood plasma be made freely for the comfort of operative patients. When the pathology of the patient is grave, and of long standing, when the operation is likely to be lengthy, serious one; when there is, or is likely to be hemorrhage, or when there is possibility of shock, it is not only advisable for the postoperative comfort, but imperative for the safety of the patient that these estimations be made.

To state it dogmatically, whenever a patient before operation, shows a bicarbonate content of 58 cc. or less, alkali should be given. The use of sodium bicarbonate in this connection is well known. The question may be asked, however, if other alkalies will not serve the purpose better. There are certain possible theoretical reasons why this may be so, but no experimental knowledge is available on this point, and therefore it can not be pressed. However, it may be emphasized that too much alkali may do harm. The ease with which this can be determined, as well as the opposite condition of deficiency, renders the matter quite simple. A second analysis of the blood two hours after administration of alkali by mouth, will indicate whether the desired result has been effected.

The management of operative cases from the standpoint of acidosis can now be said, therefore, to rest on a very definite and safe foundation.

Corinthian and Girard Aves.

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TO EXPEDITE THE PUBLICATION OF THE TRANSACTIONS OF THE SEVERAL MEETINGS THOSE WHO PRESENT PAPERS CAN MATERIALLY AID THE EDITOR BY SENDING IN ADVANCE COPIES OF THEIR CONTRIBUTIONS AT THE EARLIEST POSSIBLE MOMENT. ATTENTION TO THIS EDITORIAL COURTESY WILL HASTEN THE PUBLICATION OF PAPERS BY THREE MONTHS.

ANESTHESIA IN WAR SURGERY

DROP-ETHER PHARYNGEAL ANESTHESIA AND APPARATUS FOR ASEPTIC ANESTHESIA IN PLASTIC FACIAL SURGERY.*

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Portland, Oregon.

Plastic restoration of war wounds has made a new requirement of operative surgery. Sliding and turn-in flaps, bone transplants, secondary flaps and even skin grafts open tissues that are not infected. The mouth and particularly war wounds of the mouth always contain infective organisms. Newly opened tissues should, if possible, be protected from infection in these operations.

The anesthetic devices in general use have in the main proved satisfactory. In addition to conductive and local anesthesia, the chief reliance for general anesthesia has been the ordinary mask and pumps and blowers of various types and combinations.

ROUTINE METHODS OF ANESTHESIA NOT ASEPTIC.

By none of them, however, may one secure even an approximately aseptic field for operations about the mouth. None of them protect the field from mouth secretions and none of them permit the use of efficient antiseptics, for the reason that the respiratory tract is only relatively protected. An efficient antseptic like tincture of iodin, is highly irritative and dangerous in the larynx and trachea, and the exhaust pump, no matter how good, cannot be depended on absolutely to remove every drop of fluid from the pharynx. It has become the custom, consequently to regard the mouth as a region that could not be sterilized and give the well vascularized tissues such credit for resistance to infection that aseptic operations were not only possible, but not necessary. In a measure the reasons might apply to the vaginal or anal region. Before operating on these parts, thorough cleansing and sterilization of the surface with strong antiseptics is the rule and operation without such precautions would not be considered standard procedure. The failure of surgeons to adopt the same method in oral operations is due to the inappropriate methods of anesthesia in general use. *The same advantages may be obtained by providing a safe airway for respiration through which the anesthetic may be given and which will securely block the larynx from blood, or antiseptics strong enough to sterilize the surface, and which will, after the site of operation has been cleansed, protect it from reinfection by the mouth secretions.*

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* Read by proxy during the Fourth Annual Meeting of the Interstate Association of Anesthetists with the Indiana State Medical Association, Hotel Claypool, Indianapolis, Ind., Sept. 25-27, 1918.

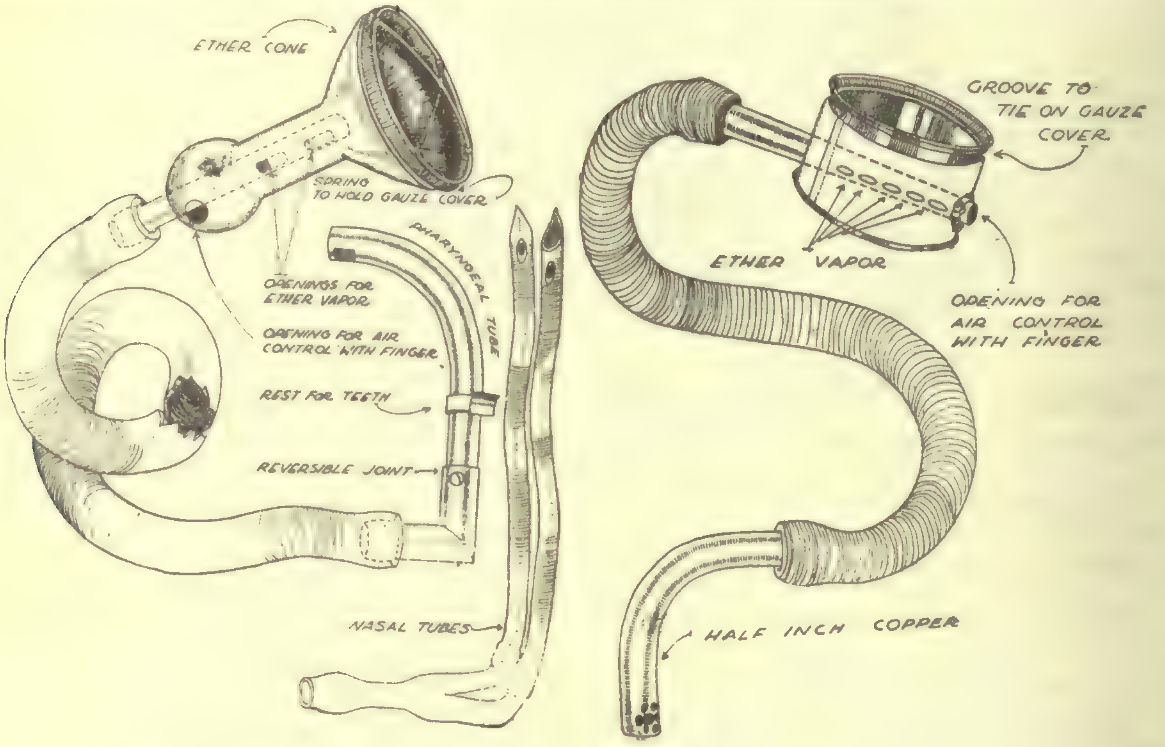

ETHER CONE
SPRING TO HOLD GAUZE COVER
PHARYNGEAL TUBE
OPENINGS FOR ETHER VAPOR
OPENING FOR AIR CONTROL WITH FINGER
REST FOR TEETH
REVERSIBLE JOINT
NASAL TUBES
GROOVE TO TIE ON GAUZE COVER
ETHER VAPOR
OPENING FOR AIR CONTROL WITH FINGER
HALF INCH COPPER

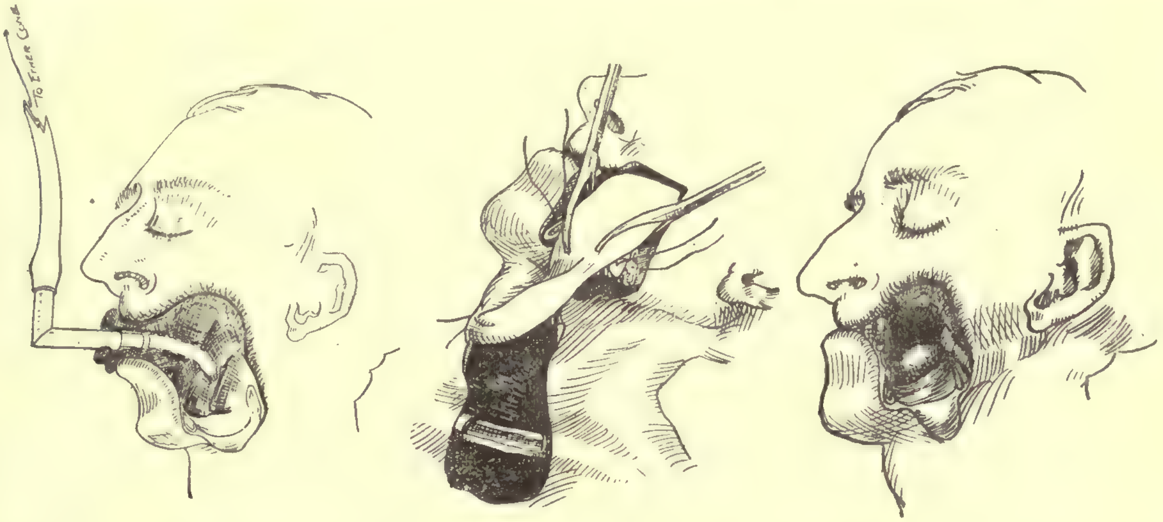
Fig. 1-2. The author's apparatus for drop-ether pharyngeal anesthesia and the war model.

THE NEWER METHOD AND APPARATUS.

Ether inhalation by mouth through a large pharyngeal tube and a coffer dam of gauze packing, when properly placed, is superior to any other method in a very large class of these cases. It furnishes that efficient block between the operative field and the respiratory tract so necessary for the performance of ideal operations in this region and makes possible a degree of asepsis in the operation, not possible by any other method. It is now over 12 years since I first adapted a curved metal tube and gauze pack to pharyngeal anesthesia by drop ether.

The inhaler I have devised for these operations consists of a curved airway adapted to the mouth and pharynx. The open and slotted end of which should be so placed that it rests just above the larynx back of the epiglottis. It is provided with a moveable joint. This permits the tube to be turned upward for operations involving the mouth and neck and downward for the face and head. The nasal tubes are attached to a Y tube so curved that the stem may be firmly fixed over the nose by a strip of adhesive plaster, which insures stability and prevents obstruction in kinking. The pharyngeal tube has an inside diameter of half an inch and the connecting rubber tube an inside diameter of three-quarters of an inch. A practical working length for this tube is 30 inches. The funnel is of spun metal, provided at the top with crossed curved wires to support the gauze cover, and is surrounded by a groove in which fits a coiled string to hold the gauze in place. The inhalation tube is so far arranged that it is not possible to pour liquid ether into it. The opening to admit air directly into the inhalation tube is placed in the bulb of the handle at a convenient place for finger control.

The demands of war surgery have so taxed the manufacturing resources of instrument makers that it is difficult and expensive at this time to obtain this well-finished instrument. For this reason I have designed a war model, which is made by removing the handle from a common tin drinking cup and running a groove around the top, on which to tie the gauze. The ether vapor way is made by constructing a half-inch tin tube with five ¼-inch holes punched into the lower side. This is passed through holes in opposite sides of the cup near the bottom, leaving one end projecting about ⅛-inch to serve as a finger control of the air admixture and the other end projecting about 2½ inches on the opposite side. This end may be expanded to ¾-inch to fit the rubber tube. An airway may be made by bending a half-inch soft copper tube in the form of the original pharyngeal tube or using the rubber tube alone, in which case it must be protected by a wooden prop or mouth gag. Any of the other solid pharyngeal airways used by anesthetists make suitable substitutes. The large size of the tubes gives free movement to the air or ether vapor current, and provides for a moderate volume of rebreathed ether and air.



Figs. 3, 4, 5. Show the pharyngeal tube in position (3), and the type of plastic facial surgery for which drop-ether pharyngeal anesthesia is adapted.

Year by year as experience has accumulated my satisfaction with the method has increased. Success may be attained only by minute attention to details. The extension of the respiratory tract across the operative field from the larynx to the ether cone requires first proper adjustment.

DETAILS OF ADMINISTRATION.

A sufficient preliminary hypodermic of morphin and atropin should be given an hour before ether is to be administered. Complete third-stage anesthesia must then be produced with the ordinary mask. The pharyngeal tube is then introduced, or in the comparatively few, in which deeper access to the mouth is required, the nasal tubes are placed. The posterior part of the mouth is then well packed with gauze. Much depends on the thoroughness and care with which this is done. The gauze pack forms the necessary dam of protection, both for the respiratory tract and for the field of operation. The inhalation tubes, either pharyngeal or nasal, may be further held in place by an adhesive strip around or over and then attached to the forehead or face as the character of the operation permits. If this is carefully done a satisfactory anesthesia may be maintained without interference.

It is essential that the ether be given by some one competent to maintain safely such a degree of anesthesia as will prevent any attempt at vomiting, which might clog or displace the tube and break the asepsis of the operating field.

These requirements, while not difficult of accomplishment, demand careful attention, but the result is certainly worth while. We may expect safety in anesthesia, facility in operation and a degree of protection from infection that cannot be obtained by any other method.

CONCLUSIONS.

In safety the supremacy of drop ether in many thousand of cases stands unchallenged. The inhaler herewith described, gives drop ether from what is practically an open mask, as the finger of the anesthetist at all times gives an instant touch control to the air admixture. This is by no means true of an ordinary funnel. The character of the respiration, which is the great indicator of safety in narcosis, is at all times apparent to the anesthetist by the sound of conduction in the tube.

When this method was first used the principal idea was to obtain a satisfactory anesthesia in these operations. The gauze pack in the mouth soon demonstrated the possibility of securing a degree of asepsis not possible without it.

A necessary preliminary is a careful cleaning of the mouth by the dental surgeon. Tartar should be scraped from the roots, and decayed, loose and abscessed teeth should be extracted, as should teeth within or about the diseased area. The greatest use for asepsis in these operations will be found in the reconstructive plastics that are required by war wounds of the face and jaws.

METHODS OF GENERAL ANESTHESIA IN FACIAL SURGERY.

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There are two main difficulties in anesthesia for operations on the face and lower jaw: (1) Maintenance of good airway; (2) difficulty of avoiding interference with aseptic technic and field of view of surgeon. In September, 1916, Colonel J. F. W. Silk suggested that cases in which blood was likely to find its way into the mouth during operation should be anesthetized in the sitting-up position. This was at once found very satisfactory. I have anesthetized in this way nearly 300 patients, and there have been no bad after-effects or complications. During the last five months we have endeavored to form an opinion as to which of the following methods of administering chloroform or ether to the various types of cases give the most satisfactory results.

Mode of Preparation and Induction.—This, for all methods except ether oil, is as follows:

Patients prepared in usual way, but without preliminary hypodermic injection of morphia. Atropin, gr. 1-100, half-hour before induction. I first tried a series of cases with morphia gr. ¼ in addition to atropin; and then another series with atropin alone. The patients in latter series were certainly in better condition after operation; and I could not persuade myself that induction was much quieter, with morphia injection. I always induce anesthesia with chloroform, using ordinary mask and drop-bottle, very often changing to mixture of chloroform and ether before patient is under.

The following is the technic employed in the seven methods:

IN THE LYING-DOWN POSITION.

1. *Chloroform, C.E., or ether, by Shipway's warm ether apparatus.*

When patient is under, a small-size Hewitt's airway is introduced into mouth, then a small, bent metal tube is connected to rubber tube from Shipway apparatus. End of metal tube is placed just inside mouth of Hewitt's airway. By this means it is possible, in majority of cases, to use a mixture of chloroform and ether and to keep patient under with one compression of bulb in every three or four inspirations. The anesthetist sits at one or other side of operating table, and, if necessary, can hold up patient's chin with one hand beneath towels, while having other hand free to work bulb of apparatus.

This method is useful for short operations when airway is good, and not likely to be interfered with by blood and mucus. It can be used in such operations as eye plastics, cheek plastics (not involving oral cavity), epithelial inlays.

Contra-indications.—Plastics involving oral or nasal cavities. Operations on jaw (owing to possibility of interference with aseptic technic).

2. *Sterile anesthetic.*

This method was especially devised for such operations as wiring and bone-grafts in lower jaw. When patient is under the anesthetist washes up in exactly same way as surgeon, while someone else carries on with anesthetic. When necessary preparation of site of operation has been completed the anesthetist, in sterile face-mask, gown, and gloves, continues anesthetic with sterilized drop-bottle and mask. The mask is held in position beneath towels in one hand, and chloroform or C. E. dropped on to upper surface of towel with other. The hands may not be changed during operation.

In these cases the jaws are firmly splinted together in closed bite position. I have never experienced any trouble from tongue falling back; laryngotomy instruments are always ready, but it has never been necessary to use them. Lately our dental surgeons have fitted splints which are joined together with screws, so that in cases of emergency the jaws can easily be separated.

3. *Intratracheal administration of warmed ether vapor.*

Owing to necessity for economy in ether it is not justifiable to use the open-ether method of induction in these cases, although I believe it to be the best. I think the catheter is more easily passed by the direct method with patient's head and shoulders on same level—i. e., without having the shoulders raised, as is sometimes done.

This method is particularly useful for plastics involving the nasal and buccal cavities.

Contra-indications.—1. Contracted mandibular arch through loss of bone. 2. Trismus from various causes. 3. Jaws splinted together. 4. Contracted mouths from gunshot wounds or burns. 5. Extensive lip plastics on account of interference with surgeon's manipulations.

Disadvantages.—1. Blood frothing up during respiration, especially in intra-oral and palate operations. 2. Occasional spasms of larynx on introduction of catheter (probably owing to faulty technic).

4. *Kahn's tube.*

This is useful for the same sort of cases as the intratracheal, with the exception of any lip plastics where its bulk precludes its use. In cases complicated by loss of bone in lower jaw where it is impossible to pass intratracheal catheter, this instrument is available either as a means of giving the anesthetic, or merely to act as an airway when ether oil is administered per rectum.

Disadvantages of technic.—1. The larynx may be small. 2. Possibility of injury to larynx. Great care should be exercised during introduction. I have seen one or two cases of slight laryngitis after its use.

5. *Ether oil per rectum.*

Preliminary Preparation.—These patients should have saline aperient on morning of day previous to operation, also dose of castor oil same evening. The following morning a simple enema is given, and rectum well washed out. A hypodermic injection of hyoscine gr. 1-100, morphin gr. ¼, atropin gr. 1-150, should be given half-hour before patient is brought to theater, when the ether oil is immediately injected in a quiet and darkened anesthetic-room as nearly as possible one hour before operation is timed to start.

I have tried two mixtures: (1) Ether 6 oz., olive oil 2 oz.; (2) ether 5 oz., olive oil 2 oz., paraldehyde 2 dr., and have come to the conclusion that the second gives the better results. The mixture is run in slowly through a funnel and tube attached to a soft rubber catheter. Catheter must not be passed more than four or five inches into rectum. Patients complain of less discomfort, if mixture be slightly warmed before introduction. I have only had one case in which injection was not retained.

If necessary, it is better to give chloroform or C. E. rather than ether as additional in these cases. If ether alone is given patient is more likely to have some bronchitis as after-complication; this applies especially to operations lasting for two hours or longer.

Immediately on patient's arrival back to ward rectum is very thoroughly washed out with warm water until no smell of ether can be detected, and no drops of oil seen in wash-out. I have noticed that after long operations (over two hours) there has been some intestinal paralysis, which causes difficulty in washing out rectum, and subsequent abdominal distension and constipation. These effects are best treated by a hypodermic injection of pituitrin ½-1 c.cm.

There is no doubt that this is a very valuable method of anesthesia for many operations in plastic surgery.

This is owing to its adaptability to surgeon's convenience during operation and on account of comparatively mild after-effect to patient. Another point in its favor is that airway is very rarely obstructed by tongue.

With regard to after-effects, the great drawback is length of time that patients take in coming round from anesthetic. This may be anything from two to four hours. But, on the other hand, vomiting is either absent, or only occurs once or twice; and patients themselves feel better than after an ordinary anesthetic. As to local complications in rectum, in a series of 100 cases there have been two patients who had slight bleeding and a few have complained of pain for two or three days afterwards. So far there have been no cases of proctitis.

This method is practically suitable for the following cases:

(1) *Bone Operations on Lower Jaw.*—(*a*) Because anesthetist does not interfere with surgeon; (*b*) vomiting is very distressing for patient who has had part of one of his ribs removed; (*c*) on account of length of operation.

(2) *Cartilage Implantations* when portion of rib cartilage is removed.

(3) *Very Long Plastic Operations* (e. g., for extensive burns); there is less shock.

(4) Cases which, from previous experience, are known to suffer from excessive vomiting after other methods.

Contra-indications.—Operations where blood is likely to find its way into pharynx, except when this can be prevented by introducing a post-nasal plug or Kahn's tube and packing.

IN THE SITTING-UP POSITION.

(A) *Chloroform or C. E. and oxygen by Shipway's warm ether apparatus.*

This was the method advised by Colonel Silk in September, 1916, and the technic is as follows:

An operating table must be obtained which will allow of head-piece being raised almost to perpendicular to form "back" of chair. To top of this can be fixed some kind of adjustable head-rest, to which the patient's head can be bound with flannel bandage. Patient sits on table and induction is carried out with mask and drop-bottle. When patient is under, his head is firmly bound to head-rest and anesthetic is then continued as follows:

An oxygen cylinder is connected by means of rubber tube to one arm of Y-shaped metal connection. To other arm is attached hand bulb belonging to Shipway warm ether apparatus, and from stem of the Y a rubber tube conveys either oxygen or air to Shipway apparatus. This arrangement economizes use of oxygen. If patient shows signs of coming round during operation, amount of anesthetic may be increased by passing air as well as oxygen through apparatus by means of hand bulb. The oxygen is allowed to bubble through chloroform or chloroform and ether at required rate.

The mixture of anesthetic vapor and oxygen is led to patient through piece of rubber tubing sufficiently long to reach from level of ordinary anesthetic table to top of patient's head; to latter end of tubing is attached No. 10 soft rubber catheter, which either is passed down one or other of nasal passages as far as upper part of pharynx, or, local conditions rendering this impracticable, it may be introduced into mouth through suitable metal tube.

Patients anesthetized in this position seem to require less anesthetic than when lying down. There is a risk of their vomiting during operation, and occasionally they have to be let down owing to faintness; both these are very exceptional. This position increases physical strain on surgeon, but on the other hand, it has three great advantages. It gives him an excellent view of patient's features; there is less bleeding, and, in the very large majority of cases, he has no anxiety concerning airway.

Long operations are no contra-indication to this position. I have had many lasting three hours, and one just over four, and the patients have nearly all been in good condition when operations were finished and did not suffer from any bad after-effects.

This method of anesthesia is particularly suitable for large plastic operations on lips and cheek plastics involving mouth. It is also useful where there is great loss of bone in mandibular arch.

(B) *Ether oil per rectum.*

The preparation and induction are exactly the same as in Method 5 above. The patient is placed on operating table on his back. Care should be taken to ascertain that he is well under, otherwise some additional anesthetic should be administered by means of mask. When required depth of anesthesia is reached "back" of table is raised to perpendicular by easy stages. Additional anesthetic, if required, is given in same way as above (sitting-up position, A). I have only tried it four times, but although results in these cases were quite satisfactory, I cannot yet say whether it has any great advantages.

SUMMARY.

From the anesthetist's point of view plastic operations may be divided into two main groups: those in which blood finds its way into the airway, and those in which it does not. I have endeavored in the following table to give a list of the various types of operations, together with the method of administration which we consider suitable for each case. Where there are alternatives the first is preferable:

Types of Operations.	*Methods of Anesthesia.*
Eye plastics	Chloroform or C. E. Shipway.
Eye plastice with cartilage implantations	Chloroform or C. E. Shipway. Ether-Oil.
Nose plastics—	
(*a*) Cartilage implantation, forehead	Ether-Oil.
(*b*) Bringing down nose	Ether-Oil, intratracheal.
(*c*) Where nasal cavity is involved	Ether-Oil, Kahn's tube.
(*d*) Where nasal cavity is not involved	Chloroform or C. E. Shipway.
Lip plastics	C. or C. E. and oxygen, sitting up. Intratracheal. Ether-Oil, sitting up.
Cheek plastics—	
(*a*) Involving oral cavity	Intratracheal. C. or C. E. and oxygen, sitting up. Ether-Oil, sitting up.
(*b*) Not involving oral cavity	Chloroform or C. E. Shipway.
Chin plastics	Intratracheal. Kahn's tube.
Jaw operations—	
(*a*) Wiring fractures	Ether-Oil. Sterile anesthetic.
(*b*) Bone graft	Ether-Oil. Sterile anesthetic.
(*c*) Either of above with jaws splinted together	Sterile anesthetic.
Extensive burns of face	Ether-Oil.

THE INTERSTATE ANESTHETISTS MOTTO FOR 1919 IS THE FOLLOWING:

AVOID THE EASY, LAZY JOB. SHUN THE POSITION THAT CALLS FOR LITTLE OR NO EXERTION, THAT DOES NOT PUT YOUR POWERS TO THE TEST, THAT DOES NOT KEEP YOU CONSTANTLY ON TIP-TOE, IN AN EFFORT TO FILL IT WELL—BETTER, IN FACT, THAN IT WAS EVER FILLED BEFORE. DON'T RUN AWAY FROM DIFFICULTIES, FROM HARD WORK, FROM HARD KNOCKS, IF NEED BE. HAMMERING HARDENS AND STRENGTHENS A MAN. IT TESTS HIS METTLE, IT DEVELOPS HIM. IT TEACHES HIM SELF-RELIANCE, SELF-CONFIDENCE, GRIT. IT DRUMS OUT COWARDICE OR TIMIDNESS AND MAKES HIM UNAFRAID TO STAND UP AND FIGHT UNTIL HE LEARNS HOW TO WIN OUT.—DOLLAR.

American Journal of Surgery

QUARTERLY SUPPLEMENT *of* ANESTHESIA *and* ANALGESIA

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Avon Lake, Ohio, U.S.A.

JULY EDITORIALS. 1919

SUGAR IN RELATION TO OPERATION AND ANESTHESIA.

P. J. Flagg has drawn attention to the value of candy in the pre- and postoperative dietary of patients coming to operation under anesthesia.

Litchfield, speaking before the A. M. A., at its last session, claimed that the intravenous injection of dextrose overcomes dehydration, intoxication and nitrogen starvation. Dehydration occurs in vomiting, diarrhea, hemorrhage, acidosis, inflammatory exudation, dysentary and cholera and in these conditions in which the symptoms are most striking the injection of dextrose changes the whole clinical picture. Patients who are desparately ill, frequently recover promptly after a single injection of from 400 to 500 cc. of a solution of dextrose.

Litchfield uses a 25 per cent. isotonic solution of dextrose where he previously used normal saline, especially in pneumonia, purulent pericarditis, meningitis, alcoholic intoxication, in surgical cases, pre- and postoperatively, in vomiting and in acidosis. The technic is that of salvarsan injection. As much as 1,700 cc. has been given in 11 hours, but one hour's time should be consumed in injecting 200 cc., or sharp reactions may occur. Other conditions demanding the use of dextrose are acetonuria, the toxemias of pregnancy and the puerperium as well as delayed chloroform poisoning.

Piper commends the use of glucose solution with a little alcohol as a rectal injection in shock and intravenously, without the alcohol, in severe hemorrhage.

Now, who will check-up on this matter and present a series of clinical observations on the value of sugar therapy in relation to operation and anesthesia?—McM.

THE NURSE ANESTHETIST IN OHIO.

The present General Assembly of Ohio has seen fit to legalize the "administration of anesthetics by registered nurses, properly trained in recognized hospitals, under the direction and supervision of a licensed and qualified physician."

Thus supervised anesthesia by anesthetist technicians now has the endorsement of law, although this pernicious legislation was opposed by all those having the interests of anesthesia as a specialty at heart.

Those behind the passage of this legislation are the surgeons and hospitals who are exploiting nurses as cheap, scab labor. They also represent a clique within the profession and hospital associations, who are precipitating the practice of medicine into socialized medicine under hospital domination.

Presently the profession-at-large will realize the fact that it has been sold-out by supposedly altruistic leaders and when the revulsion against them comes it is to be hoped that they will be relegated to the oblivion they so richly deserve for betraying the long fight for betterment in the practice of medicine and especially in the development of the newer specialties.

When these same altruists come to operation it is to be hoped they will receive a dose of the same sort of anesthesia they are now legalizing.—McM.

SEATTLE ASSOCIATION OF ANESTHETISTS.

Some fifteen interested physicians have recently organized the Seattle Association of Anesthetists with the following specialists as officers: President, Dr. Windsor A. Brown; Vice-President, Dr. Louis H. Maxson; Secretary-Treasurer, Dr. Samuel Stusser.

This movement spells progress for the specialty of anesthesia in the northwest and it is to be hoped that the organization of Seattle and vicinity is the initial step in organizing the Pacific Coast anesthetists into a large and influential association. The SUPPLEMENT and the other associations of anesthetists offer their congratulations and best wishes for success to the Seattle Association. Those wishing to join this new association should get in touch with Dr. Samuel Stusser, 514 Leary Bldg., Seattle, Wash.

Society Proceedings

Membership in a society devoted to your specialty is an essential to success.

INTERSTATE ASSOCIATION OF ANESTHETISTS —FIFTH ANNUAL MEETING.

The Interstate Association of Anesthetists has been accorded the distinction of a Joint Meeting with the American Association of Gynecologists and Obstetricians. This Fifth Annual Meeting will be held at Cincinnati, Ohio, September 15-17, at the Hotel Gibson, where the Interstate was organized in 1915.

A Joint Session will be devoted to papers of mutual interest, among them the following:

Safety Factors in the Team-Work of Operator and Anesthetist, John J. Buettner, M.D., Syracuse, N. Y. (Chairman's Address.)

The Value of Blood Pressure as a Guide Before, During and After Operation, E. I. McKesson, M.D. and Chas. Moots, M.D., Toledo, O.

Some Practical Points in Gas-Oxygen Obstetrical Analgesia and Anesthesia, A. E. Guedel, M.D., Indianapolis, Ind. Discussion and film demonstration, C. E. Turner, M.D., Columbus, O.

Some Adjuncts for Facilitating Local and Regional Anesthesia for Major Surgery, R. E. Farr, M.D., Minneapolis, Minn. (Film demonstration.)

Which Solution for Intravenous Injection in Shock?, Jos. Erlanger, M.D., St. Louis, Mo.

A special effort is also being made to hold an outstanding Section on Anesthesia for Oral Surgery and Dentistry and the following papers have so far been scheduled:

Somnoform, a Neglected Anesthetic for Oral Surgery, Oel E. Lanphear, D.D.S., Kalamazoo, Mich.

Nitrous Oxid-Oxygen Anesthesia in Dentistry and Oral Surgery, J. P. Henahan, D.D.S., Cleveland, O.

Some Observations on General Anesthesia for Oral Surgery, C. H. Burmeister, D.D.S., Cincinnati, O. (Lantern demonstration.)

Interested surgeons, dentists and anesthetists are cordially invited to attend and find out how the Interstate meets their needs for progress.

The following nominations have been made for 1920: Chairman, W. I. Jones, D.D.S., Columbus, O.; Vice-Chairman, Samuel Johnston, M.D., Toronto, Canada; Secretary-Treasurer, F. H. McMechan, M.D., Avon Lake, O.; Executive Committee, Alex S. McCormick, M.D., Akron, O.; John H Evans, M.D., Buffalo, N. Y.; Marie Kast, M.D., Indianapolis, Ind.; A. E. Smith, D.D.S., M.D., Chicago, Ill.; Ralph M. Waters, M.D., Sioux City, Iowa, and Roy S. Hopkinson, D.D.S., Milwaukee, Wis. Members are requested to submit further nominations.

The Annual Dinner will be served at the Hotel Gibson at 6:30 o'clock on the evening of September 15. A large attendance is expected so make your reservations early. As usual the visiting ladies will be delightfully entertained, so bring along your women folks.

Bring in at least one new member and don't overlook sending in your check for dues so that your Membership Card can be sent you in advance of the meeting. If you have a paper to present get in touch with the Secretary at once so that it can be scheduled. Don't hesitate to give the Interstate the benefit of your experiences and researches.

For further particulars address F. H. McMechan, M.D., Secretary, Avon Lake, O.

AMERICAN ASSOCIATION OF ANESTHETISTS SEVENTH ANNUAL MEETING.

The American Association of Anesthetists held its Seventh Annual Meeting at The Breakers, Atlantic City, June 9-10, 1919. Dr. Jos. E. Lumbard, vice-president, called the meeting to order and presided during the executive session. The minutes of the 1918 meeting at Chicago and the secretary-treasurer's report were accepted as read. The following officers were elected for the ensuing year: President, Albert H. Miller, Providence, R. I.; vice-presidents, W. T. Shannon, Detroit, Mich., and Frances Haines, Chicago, Ill.; secretary-treasurer, F. H. McMechan, Avon Lake, O.; members of executive committee, Robert L. Charles, Denver, Col., and Wm. H. Long, Louisville, Ky.

The following were elected to membership: W. T. Bailey, Boston; Anna L. Bartholomew, Chicago; Edward W. Beach, Philadelphia; Philip E. Brundage, Grantwood, N. J.; Emmett J. Craig, Kansas City; W. F. Curran, Waco, Texas; W. T. Doran, New York City; James M. Gates, New York City; Wm. G. Hepburn, Westmount, Canada; F. Elmore Hubbard, Montclair, N. J.; H. W. Kearney, Washington, D. C.; Bella Lewinson, Erie, Pa.; Arnold J. Mackay, New York City; J. R. McCurdy, Pittsburgh; George Piness, Los Angeles; John W. Rayhill, Utica, N. Y.; Boris Rapoport, Dorchester, Mass.; Claude E. Richmond, Colorado Springs; C. La Rocque, Montreal, Canada; Arthur E. Smith, Chicago, Ill.; Wm. S. Sykes, Cleveland, O.; Harold G. Walker, Wyckoff, N. Y.; Thos. A. Young, Toledo, O.

The Constitution was amended so as to admit prominent dentists, specializing in anesthesia to membership.

The secretary-treasurer was voted an appropriation of $125.00.

Dr. Jos. E. Lumbard presided during the first Scientific Session and papers were presented by Drs. S. P. Reimann, Philadelphia; Wm. deB. MacNider, Chapel Hill, N. C.; Frank C. Mann, Rochester, Minn.; Fenton B. Turck, New York City; F. L. Richardson, Boston, Mass.

Dr. Wm. B. Howell, President, presided at the remaining Scientific Sessions during which the following presented papers: Drs. Jos. E. Lumbard, New York City; Albert H. Miller, Providence, R. I.; A. W. Adson, Rochester, Minn.; H. Clifton Luke, New York City; Frank Dyer Sanger, Baltimore, Md.; W. G. Hepburn, Montreal, Canada; Wm. B. Howell, Montreal, Canada; Howard Lilienthal, New York City; Walter B. Cannon, Boston; Frances Haines, Chicago; W. T. Shannon, Detroit, and W. S. Sykes, Cleveland, O.

The papers devoted to anesthesia for war surgery were especially enjoyed, as were the films and slides of Lt. Com. Seaman Bainbridge, who was the after-dinner speaker. The annual dinner was served by The Breakers, and was well attended and enjoyed by all.

As is customary the American Association of Anesthetists will meet the first two days of A. M. A. week in New Orleans, La., June, 1920. This will be the first meeting of anesthetists in the south and it is hoped that southern anesthetists will take especial interest in making it a success. Those interested in becoming members or in presenting papers are requested to get in touch with F. H. McMechan, M. D., secretary, Avon Lake, Ohio.

NEW YORK SOCIETY OF ANESTHETISTS.

The following excerpt from the *New York Times*, Sunday, May 25, 1919, is of pertinent interest to all specialists in anesthesia:

The restriction of the administration of anesthesia to licensed physicians and the exclusion of nurses from doing such work during surgical operations was urged yesterday by James Taylor Lewis, counsel for the New York State Medical Society. On the ground that the law prohibits any one without a doctor's license from giving ether or chloroform or other poisonous gas to a patient, except when directly and continuously supervised by a physician, Mr. Lewis held that criminal action should be brought to prevent the continuation of this practice in certain hospitals, as not only was the law being violated, but lives were continually being placed in danger. If it could be shown that nurses, after special training, were competent to administer anesthetics, then, he contended, the law would have to be changed so as to give the nurse the right to do the work under the proper restrictions. Mr. Lewis recently read a paper on this subject before the New York Society of Anesthetists.

After paying tribute to the importance of the nurse in the treatment of disease, Mr. Lewis showed that nevertheless there were elements concerned in the giving of anesthetics that made it a phase of the practice of medicine as defined by the law. He then quoted the section of the public health law (Article 8, Sec. 160, subdiv. 7:)

"A person who practices medicine within the meaning of this article, except as hereinafter stated, who holds himself out as being able to diagnose, treat, operate, or prescribe for any human disease, pain, injury, deformity or physical condition, and who shall either offer or undertake, by any means or method, to diagnose, treat, operate or prescribe for any human disease, pain, injury, deformity or physical condition.

Mr. Lewis then pointed out how, in his opinion, the nurse in administering an anesthetic, did something more than place the cone over the patient's mouth, and that she had other duties which came within the definition of practicing medicine. "The nurse who gives the anesthetic and sits with the cone over the face and the unconscious patient is required to go much further. It is her duty to keep the tongue up, to watch the pulse, to pass upon the strength of the pulse, its quality, the color of the lips, the color of the skin, the condition of the skin; indeed, many other symptoms which indicate the then present physical condition of the patient to whom she is administering the anesthetic. If that is not even diagnosing the presence or absence of a disease, perhaps, then, the definition as described in our own statute means nothing.

"The operating surgeon can give no attention to the effects of the anesthetic, and if the nurse notices symptoms which seem to indicate that the patient is 'going bad' the responsibility of taking action is hers, and she must prescribe. Because some great surgeon has a woman nurse who has given an anesthetic to an enormous number of patients, and is now qualified, has no relationship to the question. Because a few nurses, through large experience, have acquired skill furnishes a poor reason for saying that all nurses, however qualified, may calmly walk into a hospital, even as a nurse on probation, or a pupil nurse, and proceed with administering an anesthetic, putting in danger the life of the patient. I am convinced that any hospital sued under such circumstances might be mulcted in damages for negligence in not furnishing qualified employees and agents in the administration of their affairs."

Mr. Lewis cited the statutes and court decisions in a number of other States, and especially that of Judge Kirby in Kentucky, in which the court said: "Dr. Frank and other physicians employing trained nurses say that in so doing they assume the responsibility. Where the trained nurse is known to them to be competent they may take the responsibility, but it is a responsibility the extent of which they probably have not duly considered. In a suit growing out of the death of a patient where the surgeon had voluntarily employed an anesthetist who was not licensed, he would in the event of his brother physicians testifying in this case certainly be held responsible."

"If a doctor," continued Mr. Lewis, "operating in a hospital in the City of New York or elsewhere, allows a nurse to administer an anesthetic, of whose knowledge he knows nothing, and of whose ability as an anesthetist he is uninformed, he must expect to be held responsible for any untoward result which ensues by reason of the giving of the anesthetic. The hospital, in turn, must be held responsible if it permits unsupervised and inexperienced women to give anesthetics, whether they be graduate or pupil nurses, because the employment of such inexperienced persons cannot be pleaded by them as a bar to an action against such institution where damage or death ensues."

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FULL EXPLORATION OF THE THORAX IN RECENT WOUNDS OF THE LUNGS.*

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The observations and suggestions to be made in this paper are based solely on personal experience, and are an attempt to standardize the methods of approach.

The paper does not deal with indications for treatment, operative or otherwise, but confines itself closely to the subject—methods of approach. In this way the discussion will be simplified and the issue will not be clouded by arguments on thoracic surgery in general.

When the entrance wound is large and favorably situated, it may be made a part of the general exploratory opening. For example, in a case operated upon by me at Evacuation Hospital No. 8, A. E. F., a soldier was wounded at 9 A. M., on October 12, 1918, and came to operation the same day at 8:55 P. M. A foreign body, 1 cc. in section by 6 cc. in length had perforated the chest wall in the axilla lacerating the lung and pericardium and emerging through the manubrium to a subcutaneous position. The missile had entered through the second interspace, after lacerating the axilla, exposing the important axillary structures but fortunately not injuring them. In ether anesthesia, after having extracted the foreign body from its subcutaneous position by a small incision, the second rib was resected and wide exposure secured by rib spreader. The apex of the lung was found lacerated but was no longer bleeding. There was an opening in the pericardium 3 cc. long which was sutured with catgut. The injury to the lung was repaired and a complete debridement of the entire wound was performed. The large defect of the pleura was repaired by using healthy lung near the apex which was sutured into the opening, being blown up into position by intrapharyngeal pressure during this part of the operation. The closure was reenforced, utilizing part of the pectoralis major muscle, but the skin was not sutured. This patient made an almost uneventful recovery and was evacuated in about two weeks.

Since the spicules and fragments of rib projecting into the chest are a source of great danger from infection of the lung as well as from trauma to the lung, the exploratory opening must be made so that the inner aspect of the entrance wound can be properly examined from within the thorax whether the wound itself be treated as a separate field or not. This is especially necessary when the wound of entrance is small or when it is not near the area of election for the main operation.

In dealing with cases in which the entrance wound is small and hemothorax and hemoptysis indicate lung injury which must be inspected and treated by operation, it is desirable to have such a surgical wound as shall make it possible to examine all parts of the thorax. This can be done through a large seventh interspace incision with wide rib retraction by means of a powerful spreader. Through such an approach all parts of the cavity can be explored and if detailed operation on a distant part is necessary the wound may be further enlarged by posterior section of one or more ribs—the Torek incision. In the majority of cases the rib cutting is not needed—merely the wide incision and rib spreading. Through this opening even the wounded pericardium can be explored and sutured. This is hardly possible with other incisions of election.

The operation completed, the wound in the thoracic cage can be easily closed by approximating the ribs with pericostal sutures of chromicized catgut or kangaroo tendon. Nor is a pleural suture required; provided the edges of the pleural wound are turned outward and held while the ribs are crowded together by the suture around them. This is rendered still easier by drawing the patient's arms to his side and depressing the scapula. The muscles and fascia are closed by interrupted chromicized catgut sutures, but especially in the wounds of war it is best not to unite the edges of the skin primarily but to make final cutaneous approximation later on by adhesive strapping.

Post mortem examination in one case in which the patient died four days after operation revealed a smooth pleural line of union with no adhesions.

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*Read before the American Association for Thoracic Surgery at its Second Annual Meeting, Atlantic City, June 9, 1919.

This operative method gave me great satisfaction in the Evacuation Hospital work, and the steps became increasingly easy with greater familiarity.

A favorite thoracotomy of some surgeons is one made by resecting the axillary portion of the fourth rib. A good view of the adjacent parts of the chest can be had through this opening and while in the absence of adhesions the different pulmonary lobes can be drawn up and palpated, the limitations of the procedure are at once apparent when it is desired to examine or to operate upon the more remote portions of the lung, such as the upper lobe; and the difficulties become insurmountable in the presence of old adhesions. One is then too apt to become optimistic and to assume that there is really no great necessity for examining this difficult part and to desist rather than make another incision hoping that all will be well. But it is better to know than to guess and the old surgical principle of "Look and See" is a particularly safe one in the chest as in other anatomical regions.

Since my return I have had one case in which the wide exploration was performed. I report it here because it is so typical and so well illustrates the advantages of the procedure.

Henry W———, 48 years old, was shot over the left nipple by a 32-calibre pistol, the ball lodging just beneath the pleura in the ninth interspace posteriorly, having traversed the lung and fractured the fourth rib in front. There was shock and a full hemothorax. I first saw the patient 20 hours after the injury. The blood pressure was 120 and 80, pulse 120 and respiration 40. The hemothorax was emptied by trocar and canula and the patient then again *x*-rayed to make sure that the bullet had not moved and was not embedded in the lung. Under the intrapharyngeal gas-ether anesthesia, a seventh interspace incision was made and the ribs retracted. Sharp spicules of rib projecting nearly an inch into the chest were removed by working from within. A hematoma of the lower lobe was found. The wound of exit from the lower lobe was pouting and oozing. It was disinfected with iodine. The bullet was removed from just beneath the parietal pleura and its bed iodinized. The wound was then closed with the lung partly collapsed. Pericostal sutures were put in, the pleura everted and the skin wound packed with gauze. (Strapped in five days.) At the wound of entrance the surrounding skin, pectoral fascia and muscle were debrided and no suture made. The patient was relieved by operation, requiring scarcely any morphine. There was superficial infection but no sign of intrathoracic disturbance and no accumulation of fluid. Patient discharged well on the 7th of May, twenty days after his operation.

The plan of operation here described is recommended as a standard procedure in cases requiring the maximum exploration in wounds of the lungs.

Nothing has been mentioned in this paper regarding any details of the operation except the incision and exposure itself. It may be well to state, however, that some form of differential pressure, by preference positive intrapharyngeal insufflation, is essential.

DELAYED SUTURE OF SIMPLE FLESH WOUNDS.

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In this paper it is my purpose to deal only with the subject of simple flesh wounds, that is penetrating wounds of the soft parts of the trunk and extremities, not involving any vital organs or bone-wounds in which the only structures injured were skin, fascia, muscle, and minor bloodvessels and nerves. These formed by far the largest percentage of cases seen in the base hospitals of the A. E. F. in France. Although, as a rule, they were not dangerous or serious from the standpoint of loss of life or limb, yet their management at base hospitals, particularly during the early part of our active participation in the war, was a matter of great importance, which had to be worked out usually by younger surgeons, who had had no previous experience in this field, and for whom no standard guide for treatment had been issued. Some of these surgeons had received preliminary instruction in the application of Carrel treatment, but for the most part their knowledge was confined to the text of Carrel and Dehelly.

While simple flesh wounds were relatively uninteresting, and the problems of chest and abdominal surgery much more fascinating, yet from a military standpoint, the simple wounds were the most important of all, because when properly managed, nearly all patients with such wounds could be returned to some form of duty, many to the front lines. In addition, the mobility of the hospital service depended absolutely upon the speed with which such cases could be cured and evacuated. Compound fractures, chest and brain wounds clogged our wards—and the only way to make room for new cases was by sending out the old ones. Inasmuch as speedy evacuation of patients, even from base hospitals, was an absolute military necessity, it would not be a gross exaggeration to state that the military efficiency of a base hospital in the A. E. F., during the emergency, depended in a large degree upon the speed with which simple flesh wounds were closed.

It did not take us long to discover that the Carrel method of sterilization and delayed suture while ideal if properly carried out, could not be worked successfully during a "push," with inadequate assistance. And during the active period from July to December, 1918, the base hospitals were filled to capacity and over, growing all the time, and manned by very insufficient medical and nursing staffs.

I shall deal but briefly with the subject of primary suture. Primary suture, after "debridement" of simple flesh wounds, is the method of choice, under ideal conditions at evacuation hospitals, when patients can be held for four days or more. This, however, was impossible during the emergency, when the wounded had to be sent to the rear almost immediately after the primary operation. After July, 1918, primary suture of flesh wounds was rarely performed by American surgeons; in fact, not more than half a dozen cases of primary sutures reached my wards during the six months' activity. [The primary suture of battle wounds, except of the head, chest, abdomen and joints, was forbidden in the A. E. F.] Practically all simple flesh wounds arrived at our base hospital, after primary "débridement" with open operative wounds. It is with this type of wound that we are here concerned.

In spite of the fact that these wounds constituted such a large proportion of our cases, not a single bulletin about their management was ever issued by the medical department of the A. E. F., and while treatment of wounds at evacuation hospitals was more or less standardized, at the base hospitals it seemed as though there were no two surgeons who treated them exactly alike. The method evolved at our hospital, developed from our own experience, aided by suggestions from surgeons of other hospitals, particularly from Base Hospital No. 6 (Massachusetts General Hospital Unit) at Bordeaux.

Appearance and Condition of Wounds on Arrival at Hospital.

Patients arrived from the evacuation hospital usually within 48 to 72 hours after the primary operation. The first dressing was usually painful, because the dressings had for the most part caked in the wound. On removal of the gauze one saw usually a raw, clean surface of muscle or fascia, often oozing as a result of this removal. There were practically no granulations. Occasionally there was a slight filmy exudate, or a slight amount of superficial slough or suppuration, more rarely large areas of superficial necrosis or suppuration.

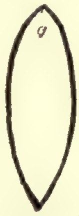

Fig. 1

The wounds varied considerably in size, shape and number. They were usually longitudinal, that is to say, with their long axis parallel to the long axis of the limb; the advantage of such excision is obvious for it meant that fewer large vessels or nerves were apt to be severed. In addition longitudinal wounds lent themselves much more readily to suture, for the muscles had a tendency to fall together. Muscles divided transversely, on the contrary, made suture very difficult, for the divided stumps retracted. The same is true of elastic fibers of the skin which also run longitudinally in the extremities.

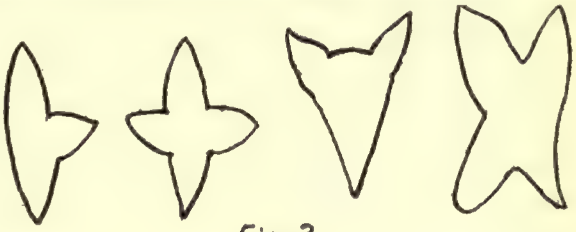

Fig. 2

The shape of wound most commonly seen was as indicated in Fig. 1, varying from one to fifteen or more inches in length, the average about four inches. Other common wound shapes were as sketched in Fig. 2.

In addition there were any number of irregular wounds, in cases where very radical excisions were necessary. The depth of the wound and the amount of fascia and muscle removed, varied with the nature of the case. Most commonly superficial fascia and a small portion of underlying muscle were removed. In more extreme cases, entire muscles or muscle groups had been resected.

Usually the wounds were two in number for each foreign body removed. One at the site of entrance and a separate excision when the foreign body was extracted. Often through and through packings had to be removed from the tract between two wounds. Multiple wounds were often encountered, occasionally as many as fifteen or twenty in the same patient. Many of these wounds showed bacterial counts of less than one to five fields even after the first dressing, and a few of these cases were sutured immediately on arrival with excellent results.

Unfortunately, it was not feasible at base hospitals to perform immediate sutures on a large scale, owing to the fact that patients came in convoys of three to five hundred, and it usually required two or three days to classify them, treat the emergencies and set the fractures. I feel certain that with more adequate facilities a large number of these cases could have been closed the day after the arrival at the base. That the great majority of wounds looked clean and showed low bacterial counts, is an evidence of the splendid work done at the evacuation hospitals, of the excellent and thorough "débridements" that were performed there. On culture one found usually a mixture of cocci and bacilli, occasionally gas bacilli or streptococci. No attempt was made at our hospital at extensive bacteriological study. A few cases of true wound diphtheria were seen, as well as an interesting series of diphtheroid infections, which latter for a short period of time were confused with true diphtheria.

Treatment Preparatory To Closure.

The preparatory treatment could be divided in general into two classes. First, intermittent instillation with Dakin's solution; second, simple wet dressings of bichloride of mercury or Thiersch's solution. Other methods, as the use of steramine paste or chlorazene spray were occasionally used, but we did not observe a sufficient number of cases to warrant any report on their efficacy.

I. Sterilization of the wound according to the Carrel method: We followed in detail the technique laid down by Carrel, with the exception that intermittent instillation was used almost exclusively instead of the continuous. The wound was first thoroughly cleansed with soap and water; then Carrel tubes were placed so that all nooks and corners could be reached by the fluid. Our solution was made fresh every day and carefully titrated. Five to fifteen cubic centimeters of fluid were injected every two hours during the day, every four hours at night, the amount of fluid depending upon the size of the wound. Nurses dressed the wounds daily or every other day, while the fluid was injected by a special nurse designated for the purpose or by teams of convalescent patients, who were often very reliable. The results were startling and corresponded in detail with the reports furnished by Carrel and Dehelly. The wounds assumed within forty-eight to seventy-two hours, a clear, healthy appearance, a bright red color with little or no secretion, and bacterial counts of less than one to five fields. The granulations were firm and flat, never puffy. However, this result could be obtained only if every detail of the technic had been carefully attended to; any slip in the technic such as improper placing of tubes, failure to give the proper amount of fluid, failure to give fluid regularly, impaired the sterilization of the wound. And as the service grew in size, errors in technic became more and more numerous, so that after six weeks it was impossible to rely upon the treatment for large numbers of cases, not because of any defect in the principle of the method, but because of the futility of attempting to carry it out on a large scale, with an insufficient medical force. Such insufficiency existed at our hospital, for example, where one surgeon took care of 250 to 300 cases with the assistance of four or five day nurses, rarely a night nurse, and some Medical Corps men. A typical instance, not at all uncommon, demonstrating the result of faulty technic was as follows: A wound apparently carefully treated for several days according to the Carrel method, and presenting a clean, healthy surface, bacteriologically negative, would be scheduled for suture the next day. At the operating table, instead of finding the same healthy surface, one would see a surface covered by purulent secretion and puffy granulations, due to failure to give injections the night before. Such errors became increasingly more frequent as the exigencies of the service became greater. It became more and more evident that Carrel treatment to be effectual at all, must be conducted with extreme care and minute attention to detail; and this care could not be given with an insufficient or a constantly shifting personnel, for in addition to the handicap of small numbers, doctors and nurses were frequently ordered from post to post or from one ward to another, according to the needs of the military service. I had the unusual good fortune to remain in charge of one surgical building for a period of over six months.

II. The other method for preparation of wounds for secondary closure was much simpler, requiring no skill or training in dressings. It consisted of simple wet packs of Thiersch's (borosalicylic) or Burow's solution (aluminum acetate) changed daily. While the wounds never responded as they did under Carrel irrigations, they were sufficiently clean after a few days to warrant secondary closure according to the method hereinafter described for wounds whose sterility was not ascertained. For, in determining whether a wound was ready for closure, according to our later technic, we learned to rely not so much on bacterial counts and cultures, as on clinical appearance. We often sutured wounds whose bacterial counts showed "infinite" numbers of bacteria per field with good results. In following the technic hereinafter described, we found that sterility of the wound was not an essential factor for safe closure. Occasionally, when in doubt as to whether suture was safe, cultures were taken, and if streptococcus or gas bacillus was present, we refrained from closing.

METHODS OF SUTURE.

The methods of closure were three in number: First, closure according to the Carrel technic, which should be performed only when "sterility" of the wound is certain; second, closure after denudation or complete re-excision of the wound; third, when the latter was not feasible, closure after curettage of all fresh granulation down to the thin film of scar over the bare muscle. By far the greater number of wounds were closed according to the second method.

I. The Carrel method of suture was applied to those wounds that had received preliminary Carrel-Dakin treatment and had been rendered "sterile." The skin was carefully cleaned with benzine and ether. Granulations were not touched —no iodine was used. The newly formed skin edge was dissected off for about one-eighth of an inch. The skin flaps were lifted on either side, preferably by blunt dissection, and the wound sutured by interrupted silkworm-gut sutures, passing only through skin. No deep sutures were inserted. The main technical difficulty lay in the fact that as the granulations which filled up the wound cavity were not excised, there was often great tension in bringing the skin flaps together across the wound. The results, even in our early cases, were not brilliant, first because of the difficulty in closure across the granulating surface, particularly in the wider wounds; secondly, about 50 per cent. of our cases became infected for one of the following reasons—either the wound surface was not sterile, or there were small cysts of pus under the flat surface of the granulation. In the latter event the surface might have looked perfectly clean and given negative bacterial counts. This observation was repeatedly corroborated in our later work, when secondary denudation of the wound became a routine, and we repeatedly found these small encysted areas of pus under the wound surfaces.

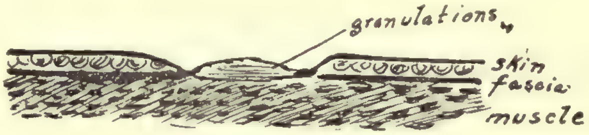

Fig. 3

II. The second method of suture was used after preliminary treatment with Dakin's solution or ordinary wet dressings. As soon as the wound looked clean, it was ready for suture according to this method. The skin surrounding the wound, and the granulations were thoroughly iodinized. Then, beginning at one angle, the skin edges and the granulations were dissected off, if possible in one piece, performing practically a denudation or secondary excision of the wound. As far as possible the granulations were not handled, and the knife and forceps used in dissection were immediately discarded. (It was during this dissection that the small sub-surface pus accumulations above mentioned were discovered). There was then left a clean muscular or fascial surface for suture. The skin was then dissected up on either side, sharply, as far as necessary to effect coaptation across the wound. As a rule the skin did not require as much

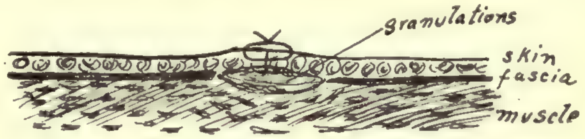

Fig. 4.

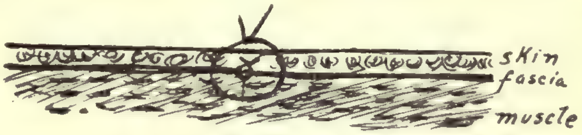

Fig 5

dissection as when the granulations were not removed. The wound was then thoroughly flooded with pure ether and sponged until dry. Whenever possible fascia was sutured separately thereby relieving tension on the skin sutures. Anatomical layers showed very clearly and suture could be performed along anatomical lines. In wounds that were difficult to close because of size or irregularity, separate fascial sutures lent considerable assistance to the final skin suture. According to this method it was only rarely that even the largest wounds could not be closed. Silkworm-gut sutures were used for the skin.

III. In the rare cases where, owing to the depth of the wound, or the exposure of an important vessel, the granulations could not be dissected off, we resorted to the curette. The instrument when used gently was perfectly safe, and it peeled off deep granulations very easily. It seemed as if there was a distinct line of clearage between the thin film of scar of the deeper portion of the wound and the overlying granulations.

Results were very much better than after suture according to the Carrel technic where granulations were not removed. Occasionally there were slight infections easily controlled by wet dressings, and even when suppuration occurred, the release of one suture and slight drainage sufficed to clear up the infection, without impairing the suture line. Entire breakdown of the suture line was exceptional. Primary union was the rule.

The advantages of this method are obvious. It is not necessary to wait for sterile surfaces, the preparatory treatment can be carried out by untrained assistants, better anatomical approximation is secured, and infections are less common. The advantages of method two over the Carrel method of secondary closure are indicated in accompanying diagrams. Figure 3 represents the wound before closure; figure 4 closure over the granulations (Carrel); figure 5 closure after excising the granulations—all in cross-section.

Lastly it was possible to allow wounds to heal without suture. Healing progressed more favorably under Carrel dressings than under any other. However, this method wastes considerable time and the functional result is less favorable. Even if it was impossible to suture a large wound completely, it was more efficient to suture it partly and graft the rest.

REGIONAL DIFFERENCES.

Wounds of the different parts of the body vary in the ease with which they can be sutured. Thus, longitudinal wounds parallel to muscle fibers and in the direction of the elastic fibers of the skin can be readily closed; while transverse wounds which divide muscle and elastic fibers can be sutured only under tension. It is more difficult to sew wounds in areas where there is little or no areolar tissue under the skin, as in the region of the wrist and clavicle, and the dorsum of the foot or the anterior surface of the leg. Wounds of the thigh can be readily closed as well as those of the buttocks, back, arms and scalp. Wounds in which muscles like the gastrocnemius, rectus femoris, or adductors of the thigh had been divided were closed with difficulty.

FUNCTIONAL RESULTS.

The results were excellent. It was astounding to discover how little functional disturbance followed enormous débridement wounds of the legs and arms, as long as important muscles were not completely divided. There remained usually small areas of anesthesia, due to division of cutaneous nerves. I have seen patients with healed wounds from hip to knee walk with normal gait.

CONCLUSIONS.

Our experiences tend to show that results are more certain and the percentage of union greater when secondary denudation or excision of granulation is performed. In addition, this technic obviates the necessity of waiting for complete sterilization of wounds, which is so uncertain and often unobtainable under war conditions. There is no doubt that, when possible, sterilization should precede suture, but even in sterile wounds we believe that it is better to excise granulations than to suture over them.

When the exigencies of the service are such that haste is an essential factor, and the organization is too small to carry out sterilization of wounds successfully, then one must be content with a method that permits suture of a large number of cases with speed and safety. During the last three months of active work at Base Hospital No. 3, A. E.F., the latter method was used almost exclusively, with the results that the average stay of patients in the hospital was considerably diminished. Rapid evacuation of the wounded was absolutely essential during this period. There was a constant cry for beds, "make room," "get your patients out," and this could only be done by evacuating to the United States the cases requiring long periods of treatment and by early suturing of the simpler cases and their discharge to convalescent camps and to duty.

500 West End Avenue.

CYSTOCELE, WITH OR WITHOUT DESCENT OF THE UTERUS.

With Especial Reference to the Technic of the Interposition Operation.

Rafe C. Chaffin, M.D.,
Los Angeles, Cal.

Cystocele with or without uterine prolapse is probably one of the most troublesome acquired conditions with which the gynecologist or general surgeon has to deal. I shall here consider only the surgical treatment because I believe no other to be of practical value. The bladder is supported anteriorly by its attachment to the pubic arch and the reflection of the peritoneum from the anterior abdominal wall to the uterus. Below, it rests on the anterior wall of the vagina, and posteriorly it is attached to the uterus.

The uterus is held in the pelvis as in a hammock, the broad ligament acting as the hammock proper, the utero-sacral ligament holding the cervix posterior and the round ligament keeping the fundus in an anterior position. This suspension permits the uterus to sway freely in the pelvis, the round ligaments permitting the fundus to be physiologically displaced by the full bladder, pregnancy, etc., and its elastic posterior suspension permits of distention of the bowels and defecation. The whole swinging structure is supported from below by the structures going to make up the pelvic floor.

The development of cystocele takes place mainly in one of two ways:

Probably the first and most constant step in the process is the backward displacement of the uterus. With the pelvic floor destroyed by laceration at childbirth or more often by being overstretched, the strain is brought to bear on the hammock structure in the pelvis. The broad ligaments being made up chiefly of peritoneum, a very frail tissue, and the round ligament being composed in large part of the uterine muscle, it is not to be expected that they will withstand, for any length of time, the stress of the intraabdominal pressure, the full bladder, weight of the intestinal contents, the fetus in early months and their own weight, especially after delivery. With conditions as just described the uterus usually heads the procession in its downward course, the bladder, tubes, ovaries and rectum following.

The other type of cystocele development is the one which is saved to a certain extent by the intervention of the gonococcus, streptococcus or other organisms. The patient becomes infected, metritis and salpingitis develop, and adhesions follow. The uterus is found fixed in the pelvis posteriorly together with its adnexa. This position of the uterus results in an increased antero-uterine space, and if not closed by adhesions a great increase of intraabdominal pressure is brought to bear on the bladder and anterior wall of the vagina. In this type of case will be found a protruding bladder and a fixed uterus with any of the other usual pathological conditions attending tubal infection.

The diagnosis of cystocele is very simple and hardly worth touching upon, but as many are overlooked by the general practitioner I shall emphasize a few points in making the examination for such a condition.

The routine examination of the patient in the lithotomy position is sufficient in the most aggravated cases but in those less evident it is my rule to have the patient first go to another room with the nurse, which relieves her to a certain extent of embarrassment, where she is instructed to assume the squatting position for a few seconds, at the same time "bearing down." She then returns to the examining room and I examine her in the same squatting position. I have thus been much surprised to find prolapses of both uterus and bladder that I was unable to demonstrate in the reclining position.

The tenaculum is of value but to some patients it is quite painful.

Treatment.—A diagnosis having been made and the degree of displacement determined, it remains for the surgeon to decide upon some plan of operation to correct all existing deformities connected with the pelvic viscera.

The anterior colporrhaphy done so much in the past is not conceded to be of much value by most surgeons. In making this statement I do not do so without giving full consideration to the various methods of excising, and narrowing the anterior vaginal wall, including the plicating of the deep vaginal fascia.

Suspending the uterus by the round ligaments can hardly be expected to pull up a prolapsed bladder and hold it when the histology of the round ligament is considered. These ligaments were never intended by nature to resist gravity by direct pull but serve simply as guy ropes to hold the fundus uteri anterior.

The Kelly fixation operation, as I understand it, was to correct a retroversion and is mechanically wrong for the treatment of cystocele.

The uterus splitting operation done by the Mayos and others was not altogether successful, because of the unsurgical aspect of the operation, the long convalescence, probability of infection, drainage, etc. I have not had sufficient personal experience with this operation to condemn it but it seems to me mechanically incorrect. The result of it, if best results are obtained, is that the patient has to carry her pelvic viscera and the weight of abdominal contents by her belly wall.

The lack of anything approaching a uniform success of these various corrective measures leads to the development of the operation known as vaginal suspension, interposition, or transposition of the uterus.

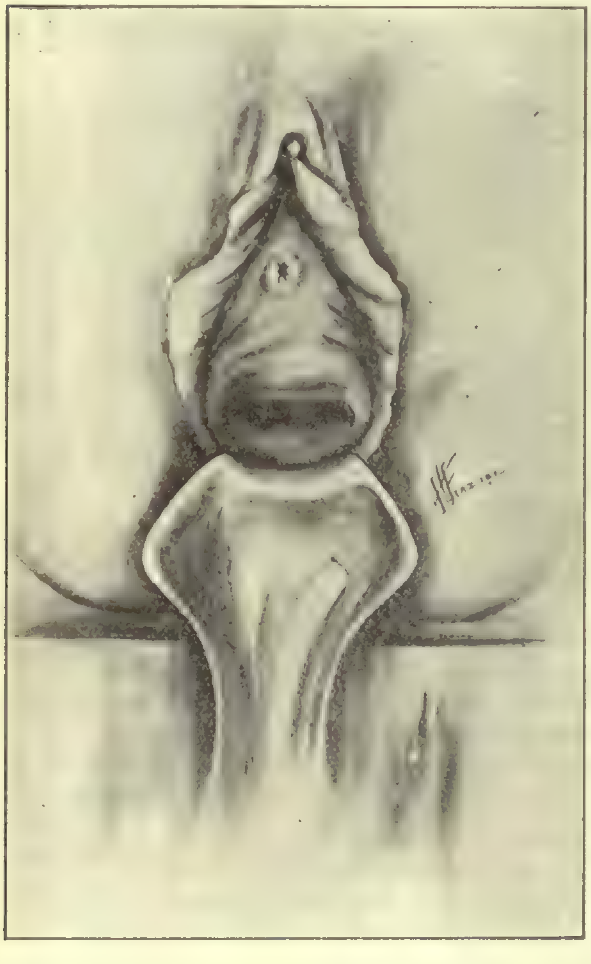

Fig. 1. Protruding bladder, moderate uterine prolapse and relaxed perineum.

This operation was formally known as the Wertheim operation, but it was later modified by T. J. Watkins and is now usually spoken of as the interposition operation for cystocele. I shall endeavor to describe the technic of the operation as I have found it easiest and quickest performed.

A fixed uterus with other pelvic diseases requiring laparotomy is not a contra-indication and the interposition can be easily made even after the removal of the tubes and ovaries by the abdominal route. I have operated upon a number of these cases and their recovery has been uneventful. They include double pyosalpinx, salpingitis, cystic ovary, retroverted uterus and the massed pelvis, adhesions resulting from pelvic cellulitis and pelvic peritonitis.

In selecting the cases for the interposition operation several points should be kept in mind:

(a) The patient cannot have children after it is done, therefore she must either be sterilized or operated upon after the menstrual function ceases.

(b) The ideal case for the procedure and where I believe no other is, is the one in which the uterus has not descended, but the bladder is markedly protruding, showing that the bladder attachment to the uterus has become so elongated that this is no longer supported from above. This is demonstrated by figure 2.

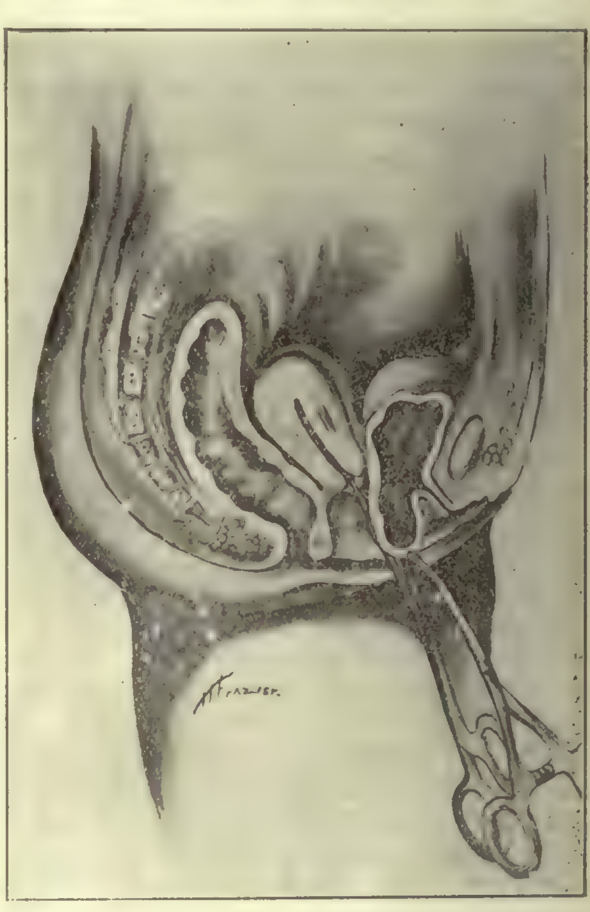

Fig. 2. Demonstrating case in which other operative procedures are not effective.

(c) First, second or third degree prolapse of the uterus cases are to be included, for most of these can be cured by suspending the uterus to the vagina and shortening the utero-sacral ligaments.

In cystocele with pelvic disease, the operation can be combined with the laparotomy and thereby replace the bladder in the abdomen.

The accompanying drawings assist in elucidating the technic:

Figure 1 shows the uncomplicated case of a bulging bladder with first degree uterine descent, the cervix just appearing between the folds of the anterior and posterior vaginal wall.

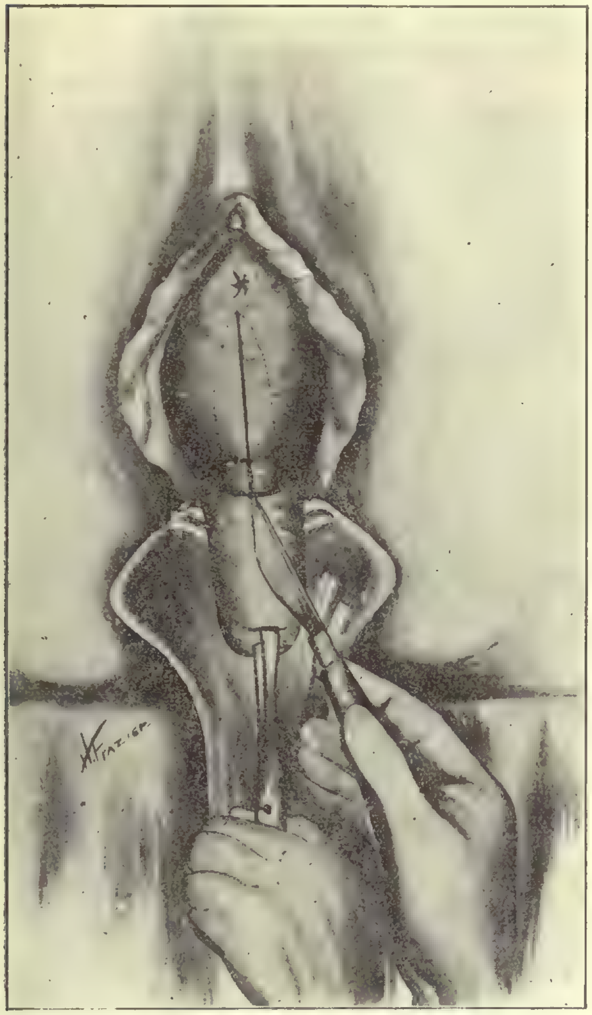

Fig. 3. Inverted "T" incision preparatory to exposing bladder. Dotted lines show outline of redundant tissue.

Figure 2 shows the application of this operation to cure the cystocele. The uterus is pushed back in the pelvis by a tenaculum and the bladder is still protruding. It is readily seen that this type of case cannot be corrected by a suspension of the uterus.

Technic: 1. Grasp the uterus, best with a Martin tenaculum, and pull centrally, shown in figure 8. If there is endometritis, currette; if the cervix is lacerated, repair but do not amputate unless there is some special indication. A uterus of normal length or a slightly elongated one, is more easily kept in the pelvis than a short one.

2. I use the inverted T incision in all cases now because I have so often found it desirable to get better exposure. Dissect the vaginal wall from the cervix and bladder well back and up to one-half inch from the meatus. (Figure 3.)

3. I apply *curved* forceps carefully to the free edges of the flaps, because that portion of the two flaps distal to such forceps, together correspond to the excessive vaginal wall previously determined upon to be cut away. (Figure 4.)

This point I wish to emphasize as I think it is original with me, and the procedure is useful not only to outline the excessive tissue, but also because it controls hemorrhage and, best of all, serves as a tenaculum to hold the flaps aside.

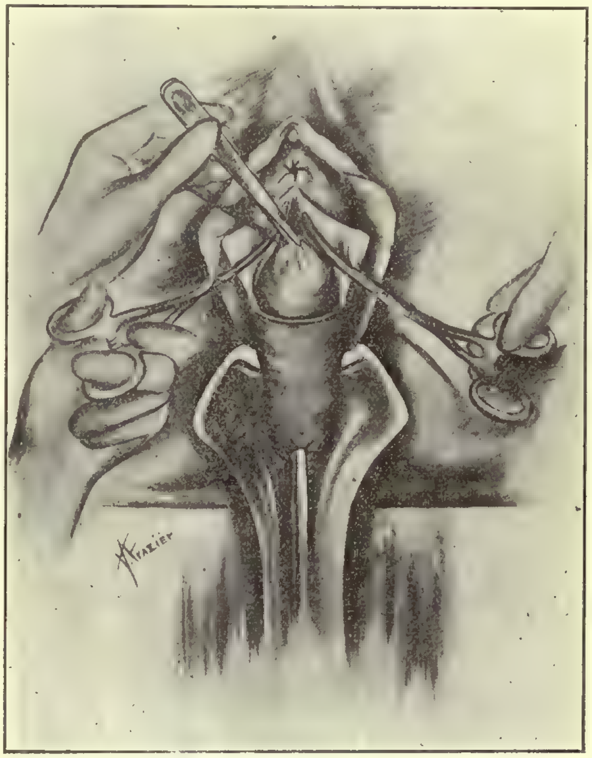

Fig. 4. Vaginal flap held aside with curved forceps, properly placed to outline the redundant tissue. Starting the mobilization of bladder.

4. Dissect the bladder from the uterus clear up to its peritoneal reflection, and open the peritoneum. The opening of the peritoneum is very much facilitated by the Martin instrument. Depress the handle and force the fundus of the uterus forward. As soon as the fundus can be grasped with a tenaculum the intrauterine tractor should be removed and the cervix pushed back toward the sacrum.

5. Deliver the uterus by successively grasping the fundus with two single tenacula.

6. Inspect the tubes and ovaries, also the size of the uterus. The size of the uterus is most im-

portant. I do not hesitate to cut away one-quarter or one-half of the body of the uterus in these cases and I think it is a very important detail not to attempt to interpose a uterus much too large to fill the vagina. Interposing an abnormally large uterus is the cause of many failures.

Severing the tubes should be done at this stage, and, of course, one must not mistake the tube for the round ligament.

7. Insert two or three No. 2 or No. 3 chromicized catgut sutures as shown in figure 5. Do not get these too far back on the fundus, for if so, the uterus will be too low in the vagina and will not only *not* be suspended but will rest on the perineum.

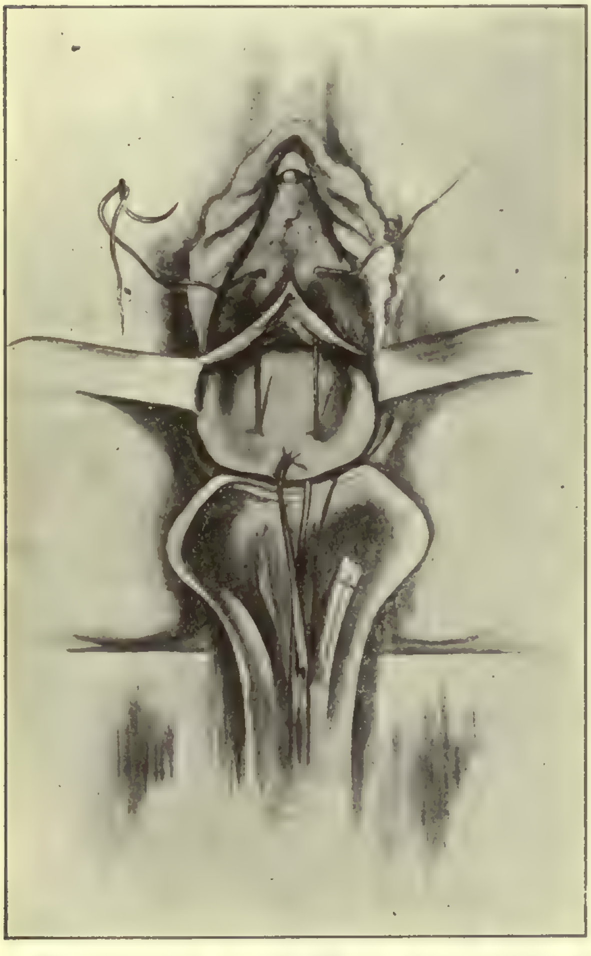

Fig. 5. Fundus of uterus is delivered, the cervix having been forced back toward the sacrum. First "suspension" suture is inserted.

After the suspension sutures are placed in the uterus, I replace the latter in the abdomen, re-thread the needles and bring the ends of the sutures through the flap from within outwards. Before tying, insert the finger into the anterior space to push the bladder well up, and thereby prevent the possibility of pinching it in the suture, much as we many times do in ligating a hernia sac.

8. Cut away the redundant vaginal flaps and insert the remaining sutures. The flap should be cut proximal to the forceps, thereby leaving a fresh bleeding edge which has not been damaged by crushing. If it is necessary in any particular case to shorten the utero-sacral ligaments the suture should be placed now but not tied. (Figure 6.)

Here I wish to explain a detail of the technic which I have not seen employed or described elsewhere and one I think very important in getting uniform results:

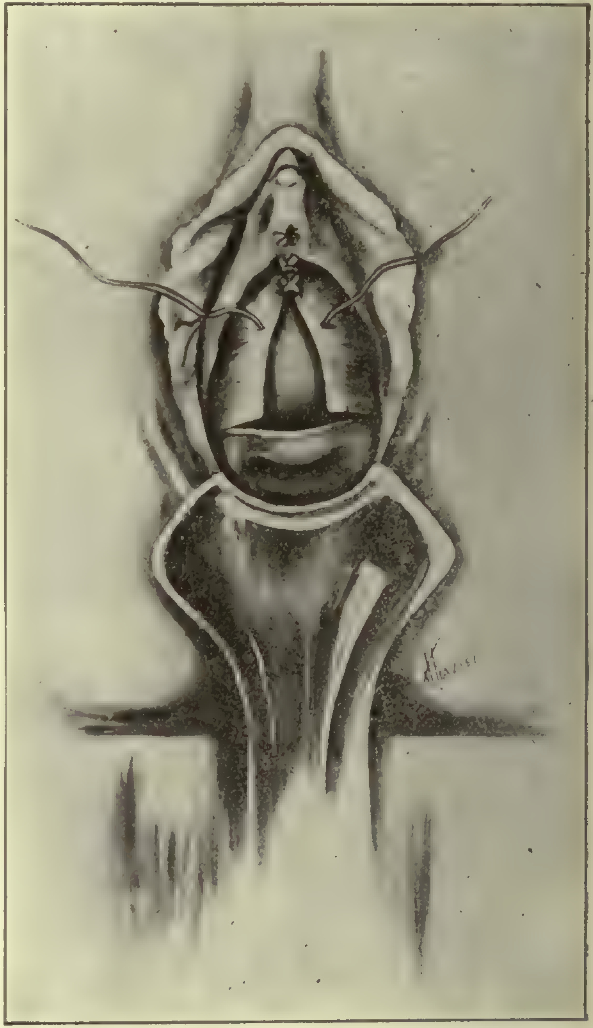

Fig. 6. Two suspension sutures tied and others being placed, getting a "bite" in anterior uterine wall. Transverse incision closed by suitable sutures.

All the sutures used in closing the vaginal wound I insert deeply, getting a good "bite" in the uterus. These sutures lessen hemorrhage, compel union between the vaginal wall and the entire length of the uterus, and obliterate a space that would otherwise be filled with blood clot.

9. Reconstruct the pelvic floor.

The levator ani muscles should be well exposed and recognized as muscle, and sutured together in the median line to the highest possible point.

The upper edge of the levator muscles forms a transverse bar to support the cervix. Figure 7 shows the necessity for and application of the high approximation of the muscles.

My conclusions in judging the results of this operation are based upon a rather carefully compiled questionnaire sent to about forty of these patients. More than one-half replied and their answers were pretty much the same, viz: that they were relieved of all former symptoms resulting from the gynecological condition. I would like very much to know the physical and mental condition of the remainder but am inclined to believe that if they were still suffering they would not hesitate to tell me. I have operated upon more than twenty patients in my private practice since the compilation of the data for this paper, and know them to be bladder symptoms.

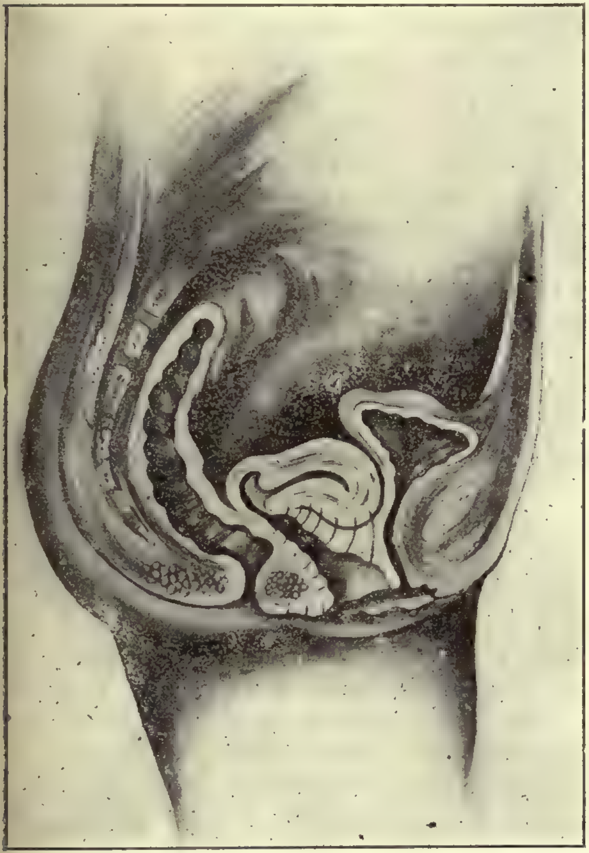

Fig. 7. Sectional view of operation completed, demonstrating all the vaginal sutures including the uterus and the high approximation of levator muscle as a shelf for cervix.

I had had the opportunity of cystoscoping several of these operated cases and found the bladder to be comparatively free from folds, though not entirely so. They seem to have no residual urine.

The advantages of the operation are:

1. It does not deform, distort or change the axis of the vagina.

2. It places the uterus in the pelvis at right angles to the outlet, thereby corresponding to the position nature placed it in.

3. By not shortening the vagina it does not interfere with intercourse.

4. It permits the bladder to expand fully.

5. It will correct a prolapse of the bladder that cannot be held up by suspending the uterus.

6. It will replace and secure a uterus prolapsed to almost any degree if modified by utero-sacral ligament shortening.

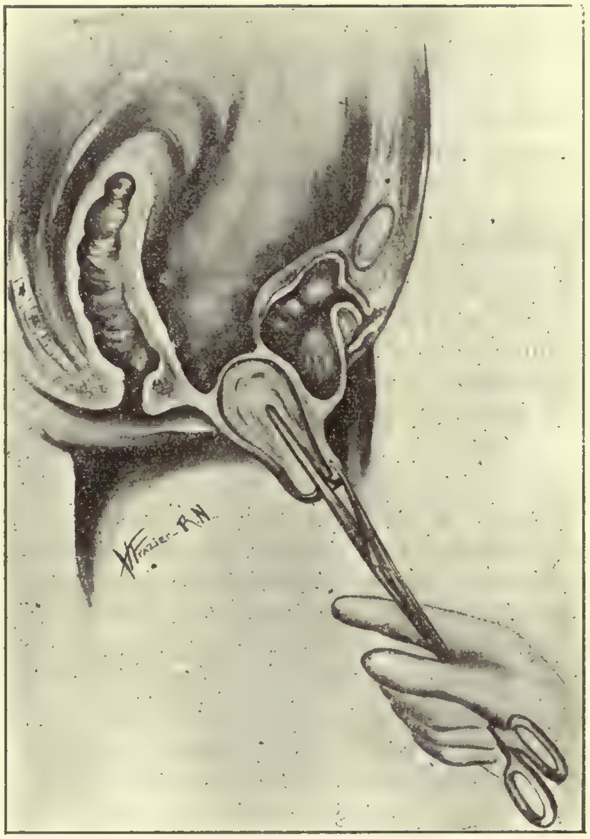

Fig. 8. Sectional view of intrauterine tractor in place preparatory to beginning the "T" incision.

7. It can be performed for the cure of cystocele even in the presence of other pelvic disease.

8. It will permit many patients to be relieved of the bladder and uterine symptoms, without submitting to an "incision." This appeals to them.

9. Convalescence is more pleasant than after laparotomy.

10. It takes no longer to perform than a Gilliam or other abdominal operation when repair of the pelvic floor is included.

Its disadvantage is:

The patient must be sterilized or operated upon after the child-bearing period.

THE SUPREMACY OF SILK AS A LIGATURE AND SILKWORM-GUT AS A SUTURE.

James W. Kennedy, M.D., F.A.C.S.,
Philadelphia, Pa.

Possibly no operator stood so firmly and so long against the popular discussion for the use of all kinds of absorbable ligatures as the late Dr. Joseph Price. As his pupil and disciple, I am in a position today to say that, in my opinion, silk as a ligature and silkworm-gut as a suture remain supereme. If there is a place in surgery where silk as a ligature cannot be used, I have failed to find such.

My experience in the Joseph Price Hospital, covering many thousands of major abdominal operations, permits me to take a positive stand in regard to ligature and suture material. There has been no kind of absorbable ligature used over a quarter of a century in the Joseph Price Hospital. This is sufficient time to put the stamp of standardization upon any subject.

In the last six thousand operations done in my institution in which we were able to close the abdomen, there has not been a single death from post-operative hemorrhage or operative sepsis. I am definite in my opinion that I could not have obtained such freedom from post-operative hemorrhage or operative sepsis, had I used any but the most reliable ligature and suture material from the standpoint of sterility, freedom from predisposition to sepsis, durability, strength, and pliability which gives the supreme tying qualities. There is absolutely no use for operators to longer contend that silk cannot be used uniformly, and therefore to me it is reprehensible that operators have not chosen a standard ligature which is as reliable from the standpoint of asepsis as the other working factors which may be a part of their technic. The truth is, the mortality in abdominal surgery of this era, if our surgical privileges are executed, is so low that the only deaths we should have come from the tragedies of surgery, *i. e.*, shock, embolus and sudden heart conditions. Therefore the surgeon who is in the running, cannot afford to have an occasional death from the melting away of the catgut ligature or sepsis therefrom. Among my small circle of surgical friends I have known of an astonishing number of deaths caused by the opening of the abdominal incision, permitting the viscera to become herniated beneath the dressings. I have never known a surgeon who used silk and washed his hands and did thorough surgery, who ever discarded this material. It is the rock of Gibraltar in abdominal surgery. During my early experience with Dr. Price I was often jaded by operators who were constantly predicting future trouble for me in the use of silk. This trouble never came, and I have at this hour a guilty conscience when in reflection I used to often wonder why does Dr. Price stand out against the entire profession. Were I permitted to digress from my subject, I could point out many other unpopular usages and procedures which this great master stood for over a quarter of a century ago and stood alone, which today are being adopted as bulwarks of the profession.

At the beginning of this war it was my surgical prayer that those gallant men who went to the front would pick out an easily sterilized and substantial ligature and suture and use them uniformly. Silk for all ligatures and silkworm-gut for all sutures used as the through-and-through suture would have been ideal war material. Silkworm-gut suture used as a through-and-through one has every substantial element where speed, questionable sterility of field and suture drainage are indicated. The through-and-through suture would have saved many operative hours and infected incisions and lowered the death rate.

It is a well-known experience to operators who are using absorbable ligatures that a certain per cent of the emergency incisions (those where ample preparation of the parts has not taken place), that such incisions break down, suppurate and gap open. I can say to those gentlemen that this will not occur if they use silkworm-gut as a suture. It has never occurred in my eighteen years' experience in the Joseph Price Hospital, where we get a large per cent. of emergency abdominal surgery, all patients going immediately to the operating room, such as Caesarean sections for eclampsia which necessitates the large incision. It has been a great satisfaction to me to see many of the strong men in the profession beginning to discard all kinds of absorbable suture and ligature materials. Some of the most recently written foreign text-books on gynecology and a number of teaching institutions have discarded catgut. For some years it has been an enigma to me why some operators would use silk or linen in hernia operations and yet be afraid to use the same in abdominal surgery. If the operator is fearful of the use of silk on account of possible infection and prolonged drainage therefrom, I would like to say to the operator who uses silk or linen in his hernia work and not in abdominal, that there is no surgical location so great a test as to asepsis of material as that of hernia. We must standardize, the day has come. Our surgical privileges are magnificent. The fuss and feathers of surgery must go. We must adopt simple and thorough methods where asepsis is the most easily attainable. This insanity of uncertainty which talks about seven or twelve day catgut or fifteen and twenty day kangaroo tendon must go; it is not the best we have. We have a single high standard of ligature in silk which covers all. The operator who claims that a large per cent. of silk used in abdominal surgery is not absorbed, is either not familiar with the subject or else he is too hidebound to be fair-minded. If the surgeon chooses to use Cunard hawsers tn his surgery, such huge ligature is not absorbed and may remain a source of trouble. The largest size we ever use is a number four which when stretched immediately after taken from boiling water, becomes a number three in size, is more smooth has less capillarity and still has the strength of a number four and makes a tighter tie as the stretch has been taken out of the ligature before the tie. The deaths that have occurred from a faulty tie incident to the absorbable ligature, would condemn it forever if recorded *per se*. Silk has often been condemned on account of the so-called dead ligature, when the real cause of the continued discharge from the sinus was a portion of some pathological lesion which the surgeon failed to remove. This is most often seen following the tie for removal of a tubal or ovarian abscess in which a portion of the pathological structure has been left proximal to the tie. It has not been my object in this discussion to take up the relative merits of different ligatures from the standpoint of asepsis, as much as it is my object to say to the profession that they have in silk a ligature supreme which may be used in any and all conditions. I am quite positive, were I the manufacturer of catgut or any kind of absorbable ligature, I would not feel less that all the hospital epidemics of "ligature infection" came from my lack of proper preparation of the ligature, than that the operating staff's abilities must be dealt with. I am often astonished at the liberties some men take in their circle of aspesis. Men condemn me for operating with gloveless hands, yet I shudder at the privileges they take with the gloved hand. If I may look back over six thousand abdominal operations with gloveless hands without operative peritonitis, may I continue without gloves? The natural potentialties of suture and ligature material must be dealt with. The least subject to infection of all used suture material is silkworm-gut, and when used as through-and-through suture of course it can give no trouble in any instance. It is the Marion Sims silver wire of our day.

If two operators with equally unclean surgical habits attempt to close the abdomen, one with either catgut or silkworm-gut by terraced method, the other by through-and-through method, it is conclusive without argument that the operator who uses silkworm-gut as a through-and-through suture might escape infection, while the surgeon using either catgut or silk by terraced method would often be in trouble. I do not know whether or not men can ever be taught the use of the straight needle in closing the abdomen by through-and-through suture with silkworm-gut, but I am in a position to say that operators are robbing themselves of the most stable principle in the entire technical realm of abdominal surgery in not being able to use t needle and through-and-through suture. After all, it depends upon the way we have been brought up. I have heard many times condemnation from prominent teachers of some of the most stable facts known to surgery. I have grown this old in abdominal surgery that I prefer to stand alone or with the few and accept the condemnation and abuse of the majority as long as I know my grounds are clean and cultivated to their fullest capacity. I do not hesitate to go on record in the prophecy of the abandonment of all absorbable ligatures. There will be but one condition to prevent it and that is the profession may be too much married to a trodden theory to try something else.

Over eighty-five per cent. of my repairs of the cervix and perineum in the Joseph Price Hospital have been previously repaired with some kind of absorbable ligature and have come to me as absolute failures. So many of these patients have been previously repaired by well-known men who are teachers of gynecology, that it is not fair to assume so large a per cent. of failures are due to faulty surgery; I therefore, feel much of such reprehensible work must be due to faulty suture material. Absorbable sutures never had any place in the repair of the birth canal. The trouble with us all is, that we have had the "Acre of Diamonds" in our back yard for years but have been tramping the surgical world over for something of infinitely less value.

The most excellent rule I know in surgery ts to never use anything as ligature or suture that cannot be boiled.

241 North 18th Street.

NON-UNION OF FRACTURES.

Leo Bloch, M.D.,
Louisville, Ky.

After complete reduction of the bone following recent fracture there is first the formation of provisional callus, second the invasion of osteoblasts, third calcareous deposits around the osteoblasts, and fourth absorption of functionless osseous formations. Anything that interferes with these physiologic processes causes non-union.

There may be other associated conditions which may act as predisposing or contributory causes of non-union of fractures, such as: defective reduction of the fragments so that it is impossible for bone repair to bridge the defect; too much motion; interposition of periosteum, muscle, fascia or a fragment of detached bone between the fractured ends; interference with the blood supply due to vascular injury or too tight bandaging; disturbance of the nerve supply; fixation of the bone by foreign bodies, such as metal plates, wire sutures, plugs, nails and screws; tuberculosis, syphilis and other infectious and debilitating constitutional disorders.

Non-union is oftentimes the logical result of delayed union; that is, after the proper time has elapsed for firm union to have occurred it is found that the physiologic repair functions have not been fulfilled. In such instances union may oftentimes be secured by the stimulation afforded by motion and exercise.

In other instances of non-union there is found a fibrous band uniting the fragments. This is caused by the premature ending of the process of ossification, and is known as fibrous union. Pseudarthrosis is another form of non-union: the ends of the fragments become surrounded by a ligament thus forming a false joint.

Case I. N. M., aged seventy-two years, had a spiral fracture of the tibia and also a transverse fracture of the lower end of the fibula which were carefully reduced. Upon removal of the plaster cast at the end of eight weeks I found firm union of the fibula but non-union of the tibia. On account of arterio-sclerotic changes the patient was an unsuitable subject for autoplastic bone graft. I made a cast from sole leather which laced in front and started him walking with the aid of a crutch. After four months' treatment with reconstructive tonics, etc., he made a complete recovery. Non-union in this case was evidently due to deficient blood supply.

Case II. M. S., aged thirty-five years, sustained fracture of both bones of the forearm and was brought to the hospital with non-union of eight months' duration and musculo-spiral nerve paralysis. After careful examination it was decided that an open operation was the most appropriate method of procedure. The muscle, fascia and nerve were found interposed between the ends of the bones, which, of course, explained the cause of non-union. I proceeded to freshen the ends of the bones, brought the fragments together and held them in position by "Grant's gimlets." Firm union was thus secured with complete restoration of the function of the arm.

Case III. M. S., aged fifty-two, a nephritic and cardiac subject, had a supracondylar fracture of the femur with great deformity and non-union of twelve weeks' standing. I applied Buck's extension apparatus on a double inclined plane. On account of the development of trophic sores pillows were kept under his knee for four weeks. The patient was then taken out of bed and a steel brace without joints fastened to the shoe and around the hip with a high heel on the sound foot. After a few days the high heel was removed and the patient allowed to walk. Callus formation began promptly and after six weeks firm union had occurred. In this case non-union was caused by non-approximation of the fragments and constitutional disease.

In fibrous union and pseudarthrosis open operation is the best method of procedure. A live bone graft, with periosteum removed, driven into the medullary canal is the proper plan for stimulating osseous repair in pseudarthrosis, whereas in fibrous union the proper method is an ordinary live bone transplant bridging the defect.

In operative bone surgery technic and aseptic precautions must be carefully observed. There should be no touching of the tissues even with the gloved hand, the surgean relying entirely upon instrumental manipulations. The least infection may destroy all hope of success, and oftentimes makes amputation necessary to save the life of the patient.

As a matter of historical information the following items on non-union of fractures are abstracted from a contribution to the literature by the great Robert Liston nearly one hundred years ago. He says that union of broken bones takes place very slowly under some circumstances, and may altogether fail. This depends upon constitutional or local causes, or upon an indifferent, careless, or meddlesome treatment. The broken ends may be separated from each other, and rounded off; they may be in contact, and surrounded by a cyst formed by condensation of the cellular tissue; or they may overlap considerably, and lie side by side, either in close apposition, or with some substance interposed.

Among the constitutional causes which may give rise to this state of the parts are: syphilis, pregnancy and lactation, cancer, advanced age, improper abstinence from food or the withdrawal of an accustomed stimulus, scurvy, fevers of a low type, or any other disease inducing great debility, or actual prostration. The most common local causes are: too wide a separation of the fractured extremities, necrosis or other disease of the ends of the bone, tight bandaging, and the too early use of the fractured limb.

If non-union depended generally upon want of perfect rest in the injured part, the bones that are with most difficulty retained in apposition after fracture are those in which we should expect most frequently to meet with it. The clavicle, comparatively speaking, is rarely the site of an ununited fracture, and yet did non-union depend upon mobility, that bone of all others is the one which we should find most frequently affected. The ribs we daily see well united after fracture, despite the constant motion to which they are subjected in respiration.

Causes may be suggested to account for non-union, some of which may seem plausible, or be shown to operate in particular instances, but in many cases its occurrence cannot be satisfactorily accounted for. That the state of the constitution has considerable influence over the process of repair in fractured bones, none can deny. On the other hand, how many cases have been observed, where more than one fracture has existed in the same individual at the same period, and where though all be equally well treated want of union will follow in some one of them?

Disunited fractures are sometimes met with which occasion so little inconvenience as scarcely to interfere with the use of the parts in which they may be situated, and under such circumstances it is questionable whether the trial of any operative means should be recommended for their cure. Even where want of bony union after fracture has not permitted the patient to make use of his limb, we often find that by the employment of simple means, as a leather, tin, or pasteboard cast, the defect may be rendered very supportable. In the majority of instances, however, the extremities affected by pseudarthrosis become almost useless, and resort to operative means is demanded by the patient. In the treatment, no exclusive method should be adopted, and in deciding upon the plan to be pursued, we should be governed by the situation of the injury, whether near a joint or otherwise, the limb affected, the length of time the fracture had existed, the degree of mobility existing in the fragments, and whether they are in apposition or otherwise.

Liston's summary of the treatment is appended merely as a matter of comparison with methods now in vogue. Of course much of the technic then employed is now obsolete.

(1) To apply the method of cure by rest and compression. If the fracture has been regularly treated, and is not consolidated at the usual period, replace the limb in the apparatus and insure to it a state of complete immoveability: if the treatment of the injury has been altogether neglected, or been inefficient, apply proper splints and moderate compression with a roller, and renew these as soon as they become in any degree lax;

(2) If from want of action in the site of injury, rest and compression are in themselves insufficient to produce a cure, continue the state of immoveability in which you have placed the limb, and apply blisters, moxas, or some other stimulant to the site of fracture;

(3) If both of these modes fail in producing a deposition of callus, employ frictions;

(4) If the methods mentioned fail to produce a change, or the patient has already been suffering from his injury for eight or ten months, and there is no contra-indication to it, resort to the seton;

(5) If the case be one to which, from its long standing, or state of the injured parts, the seton is inapplicable, expose the fracture, and apply caustic potash to the fractured ends;

(6) If all of the foregoing means have been carefully resorted to unsuccessfully, and not until then, resect the ends of the bone.

He adds as a commentary: "In employing any part of the above means, any obstacle to the occurrence of union which may exist, arising from the state of the constitution, should be carefully sought for, and combatted, by an appropriate treatment."

HOSPITAL FLOORS.

No floor can surpass a wooden floor for cleanliness if properly laid, filled and dressed, and none can be more abominable if these precautions are neglected. For all-around service, fine-grained maple is probably the best that is available. It is quite as tough as oak, and nowhere near so brittle as kiln-dried oak; it is more elastic than oak and is finer in grain.—Jacques W. Redway, in *The Medical Times.*

MEDICO-LITERARY MISAPPLICATIONS AND AMBIGUITIES.

A Semi-Critical Commentary.

Charles C. Mapes,
Louisville, Ky.

The *raison d'être* of this commentary may be found in the prevailing misapplication of certain literary and medico-literary terms by the majority of modern authors. Some of the strictly medical ambiguous expressions to be mentioned originated with the "Fathers in Medicine," others are of more recent acquirement, whereas some have only a colloquial application.

The following somewhat peculiar literary contortions abstracted from the *Scientific American* will serve as an appropriate introduction to a limited number of strictly medical *contretemps* collected at random from available literature. The presentation of a complete list of ambiguous medical terms would require more time and space than can be accorded this dissertation.

There is no cream in cream of tartar, in cold creams, nor in chocolate creams; no milk in milk of magnesia, in milkweed, nor in the cocoanut. These are as remote from the cow as is the cowslip. There is no bread in breadfruit, nor grape in grapefruit; a pineapple is neither pine nor apple; a prickly pear is not a pear; an alligator pear is neither pear nor alligator; and a sugur plum is not a plum. Apple butter is not butter; there is no butter in buttermilk, butternuts nor in buttercups; and flies in the dairy are not butterflies. Peanuts are not peas, and it is doubtful whether they are nuts.

Monkey wrenches are neither made by nor of monkeys; poles are not made from polecats, nor badges from badgers. A lathechuck is a device attached to the mandrel to hold the turning wood, but it is not a woodchuck; a woodchuck is a groundhog, which is not hog nor it is ground;—ground hog is sausage;—and a lathe mandrel is not a monkey, although a mandrill certainly is.

Angel food is not eaten by angels; there are no sponges in sponge cake; and the eating of lady fingers does not imply cannibalism. Sweetbreads are not sweet, nor are they bread. Chickenpox has nothing to do with chickens, neither has an eggplant, nor a cocktail. Horse chestnuts and horse mackerel are as far removed from the *genus equus caballus* as a saw-horse, a clothes-horse, or a horseradish; a horse chestnut is a nut, and so is the device which is applied to a bolt.

The catgut of commerce is no more feline than pussy-willow or cat-tails; and firedogs are andirons which are not infrequently made of brass. A policeman is called a copper or a bull, but an Irish policeman is not an Irish bull. Whiffletrees, boottrees, hall-trees, and family trees are as much out of place in the woods, as a railway frog, a fish plate, a fish story, a mackerel sky, or a crabapple, in the water.

Infinitely more ridiculous literary contortions and misapplications of words, prefixes and suffixes are noted in the writings of both ancient and modern medical authors, as illustrated by the following examples:

(1) Neisserian Urethrorrhea: The word *gonorrhea* is one of the most ancient misnomers in medical history. The prefix *gono-* signifies seed, or semen, and the suffix denotes a flow or discharge; therefore the word gonorrhea literally interpreted means a flow of semen. Excepting by inference there is nothing to suggest in what anatomic situation the flow originates nor through what aperture it emerges. The word contains no etiologic nor pathologic significance and fails to convey the least information concerning the contagious disorder it is intended to represent. The prefixes *gona-*, *gone-*, and *gono-* can be correctly used only in relation to the anatomy and physiology of the reproductive glands. Obviously, also, *gonorrheal* wherever and however employed is equally ambiguous and incorrect. Certainly no one would be willing to admit that in so-called gonorrheal endocarditis there occurred a flow of semen from the cardiac apparatus. Even the causative diplococcus isolated by Neisser is mis-named the gonococcus which merely means semen berry. The terms *blennorrhea, blennorrhagia* and *urethritis* are likewise inexact; the two former signify a flow of mucus without indicating its origin or exit, and the latter denotes inflammation of the anatomic structure which the word suggests without reference to the etiologic factor responsible for its existence.

In this connection the relation of a personal experience may be permitted: A specimen of purulent material from the urethra was submitted to a well-known laboratory for bacteriologic examination to determine the presence or absence of Neisserian disease. The report contained the ambiguous information that the specimen was "loaded with micro-organisms morphologically similar to gonococci!" It was rejected and returned to the laboratory with the notation that a thousand things might be morphologically similar, and the pathologic diagnosis was therefore not only inaccurate but worthless.

(2) The Urocystic Apparatus: From time

immemorial it has been customary to speak of the urinary storage reservoir as the *bladder,* more correctly but less commonly the urinary bladder; and concretions found therein have been familiarly known as bladder stones or vesical calculi. The accurate name of this viscus is the *urocyst, cystitis* is literally *urocystitis,* and concretions composed of urinary constituents are *uroliths* regardless of the situation in which they may exist. According to location such concretions may be classified as renal, ureteral, urocystic, and urethral. The ambiguous term bladder should be eliminated from medical parlance.

(3) Anuria and Urinary Excretion: The majority of authors use the terms *anuria, urinary suppression, obstruction, dysuria,* etc., synonymously and interchangeably, disregarding the fact that each has a separate and distinct signification; it has also been the custom to specifiy the degree of anuria, i. e., whether partial or complete. It must be obvious that anuria means no urine, consequently there can be no variations in degree. When urinary excretion is scanty or the outflow obstructed, the designation anuria is inaccurate; and *dysuria, uroschesis* and *pollakiuria* bear no relationship whatever to anuria, since urinary excretion is uninterrupted. The terms secretion and excretion are also grossly misapplied. Urine is excreted and not secreted by the renal apparatus, yet the latter word is almost invariably employed for the former; and the same is true of the excretions of other glandular structures.

(4) Manustupration: *Mentulomania* and *clitoromania* have been suggested as scientifically exact for manustupration in the male and female respectively, more familiarly known as masturbation, self-abuse, secret vice, onanism, self-pollution, and various other ambiguous terms. Anatomically, however, the name manustupration seems sufficiently expressive since it implies use of the hand for orgastic induction. The opinions of others to the contrary notwithstanding, it is believed manustupration is an evidence of individual physiologic normality rather than pathologic abnormality; were it otherwise about ninety per cent. of adolescent and adult males, and sixty per cent. of females, would have to be classified as abnormal and pathologic. Nothing has been more unwisely exaggerated than the presumed physical, mental and moral disastrous effects of manustupration, nor is there a subject embraced within the science of medicine about which more misinformation exists.

(5) The Cholecystic Apparatus: Some of the most prominent surgeons in the world insist upon accuracy of the expression *gall-stone disease.* They seem to ignore the pertinent facts that technically and scientifically gall stones are *choleliths,* that the correct name of the so-called gall-bladder is the *cholecyst,* and that a diseased gall stone would be a *rara avis* impossible of demonstration. The terms cholelithiasis, cholecystitis, cholecystostomy and cholecystectomy are accurately utilized, but in speaking of the fundamental anatomic structure the term gall-bladder is substituted for cholecyst. The ambiguous term *jaundice* is used for *icterus* or *choloplania* although it bears no relationship whatever to the hepato-cystic tract.

(6) The Suffix "Oid" and Prefix "Para" in Pathology: A specimen of presumably carcinomatous tissue was recently submitted for diagnostic confirmation to a prominent pathologist, who, after microscopic examination, made the pathologic diagnosis of epidermoid carcinoma. His report was rejected because the suffix *oid* only means that the tissue examined resembled the skin, the word epidermoid conveying not the slightest pathologic information; moreover, granting the tissue may have resembled the cutaneous structure, that factor alone did not indicate malignancy. For similar reason every word ending in *oid* when pathologically applied is meaningless. A complete list of such terms cannot be given, but the following are commonly used by pathologists: Dermoid, cheloid, cancroid, chancroid, epidermoid, epithelioid, mycoid, fecaloid, teratoid, "neurasthenoid," and "rheumatoid." In describing certain peculiarities of anatomic conformation the suffix *oid* is permissible, but not in descriptive histo-pathology. Similar statements may be aptly applied to the prefix *para*—which merely denotes near, against, or beside, when used strictly in a descriptive pathologic sense. On this basis such clinical diagnoses as *parasyphilis, paratyphoid fever,* etc., would seem the height of scientific absurdity.

(7) Fecal Obstruction or Stasis: Every surgical text-book in Christendom contains an elaborate description of the mechanics of so-called *intestinal obstruction,* and this term is universally employed in current literature. The reminder seems pertinent that, excepting within the narrowest limits, the intestine is an immovable structure and therefore cannot be the subject of stasis or obstruction. *Fecal obstruction* or *fecal stasis,* which denotes interference with the onward progress of feces through the intestinal lumen, should be employed regardless of the cause of the phenomenon. The same remark will apply to intestinal stasis (Lane), ileus, and other synonyms by which fecal obstruction is known.

Likewise the term *bowel* to represent any portion of the gastroenteric tract is ambiguous; the word simply means something located within and has no reference to the intestine or rectum. Even the rectum is misnamed, since it is far from being a straight channel.

(8) Celiotomy and Ovariectomy: The words *laparotomy* and *ovariotomy* have been much misused for many years. *Laparotomy* signifies incising the loin, and *ovariotomy* means cutting the ovary; therefore both terms are ambiguous and inexact. *Celiotomy* and *ovariectomy* or *öophorectomy* should be substituted. Of course, where the loin is incised laparotomy is correct, but not otherwise when referring to abdominal section.

(9) Posthectomy: The term *circumcision* has been in common use in both lay and medical circles since the beginning of history, yet it can only mean circular cutting and has no reference whatever to the anatomic region surgically attacked. The correct designation for surgical extirpation of the prepuce is *posthectomy*.

(10) Pre-cancerous Lesions: One of the most dangerous ambiguities recently introduced into medical nomenclature is the term *pre-cancerous,* which literally means something existing prior to the development of carcinoma. It is dangerous from the standpoints of both the laity and the medical profession, because every benign lesion might be considered pre-cancerous. It must be remembered that despite individual erudition it is physically impossible for the observer in any instance to predetermine whether or not a benign lesion will eventually undergo malignant transformation; and to extirpate by radical surgical intervention every recognized benign lesion fearing ultimate malignancy would represent an extreme degree of ergasiomania which should neither be recommended nor tolerated. While this statement applies with equal force to benign lesions irrespective of their anatomic situation, the female breast has probably suffered the greatest amount of unjustifiable mutilation.

(11) Esophago-ventricular Spasm: It has been customary to designate spasmodic contraction of the esophago-ventricular aperture as *cardiospasm.* The fact has evidently been overlooked that literally the word means spasm of the heart,—an entirely different phenomenon having no direct relationship to the esophagus or stomach. Therefore *cardiospasm* is technically and anatomically incorrect as at present applied. *Esophagospasm* only partially conveys the intended meaning, as a portion of the ventricular musculature is also implicated in the spasmodic contraction.

(12) Parotitis: Who first employed the word *mumps* to represent parotitic inflammation cannot be definitely stated, but it has been in common use by the laity for centuries and also appears in medical literature. The correct pathologic designation is *parotitis,* which may be either unilateral, bilateral, epidemic, sporadic, suppurative or non-suppurative.

(13) Rabies: Even in quite recent discussions certain authors have attempted to maintain that the term *hydrophobia* is correct. The word originated with the ancients and literally interpreted means fear of water. Certain authors still question the existence of such a pathologic entity as *rabies canina* or *rabies humana.* They believe that the most logical explanation of the uncertain and indefinite symptomatology presumed to be due to rabic infection in the human being, at least in a large percentage of instances, may be found in inordinate fear and too vivid imagination, plus unwarranted interference of relatives and doctors. In any event the word *hydrophobia* pathologically applied is a misnomer.

(14) Neurasthenia and Hysteria: These two words have covered a multitude of professional sins of omission, commission, and ignorance. It would seem that the vague symptom-complex which induces the uncertain diagnosis of *neurasthenia* or *hysteria* must have a pathologic basis which careful anamnestic and clinical investigation should reveal. Too frequently the physician seems willing to accept the diagnosis made by his patient.

(15) The Arthritic Group: It seems a strange commentary that modern authors persist in employing the terms *rheumatism, rheumatic, rheumatoid,* etc., which have absolutely no etiologic nor pathologic meaning. The word *rheumatism,* like *neurasthenia* and *hysteria,* has too frequently been utilized as a protective shield for diagnostic and pathologic inaccuracy. The definition of rheumatism has been made to embrace the following separate and distinct types of pathology which may or may not be possible of clinical demonstration: Myalgia, myositis, neuralgia, neuritis, chondralgia, chondritis, ostalgia, osteitis, arthralgia, arthritis, osteochondralgia, osteochondritis, arthrochondralgia, arthrochondritis,—and a host of other definitely or indefinitely localized aches and pains to which human flesh is heir. The terms *rheumatic* and *rheumatoid,* when applied to tonsillar, cerebral, cardiac, cutaneous, ocular, intestinal, pulmonary and other visceral lesions attended by painful sen-

sations are not only meaningless but unscientific and absurd.

(16) Hereditary Influence: There seems no limit to the pathologic, anatomic, developmental, physical, mental and moral obliquities which have hitherto been attributed to the intangible influence of hereditary transmission, and the ambiguous expressions relating thereto are so numerous as to preclude specific mention. The assertion is made without fear of successful controversion that no physical nor mental obliquity can be correctly ascribed to the influence of heredity. The pertinent fact cannot be ignored that irrevocable substantiation of the theory that anything is actually inherited, presupposes that either the spermatozoon or ovum (or both) was the subject of similar defect at the time of fructification; and it is an immutable embryologic dictum that imperfect germinal cells are incapable of being fructified. Infinitely less tangible information exists concerning the influence of heredity than any other subject in medical science. The developmental and other irregularities in physical conformation commonly attributed to hereditary influence and maternal impressions are explicable upon other and more reasonable hypotheses.

(17) Ulitis: Both dentists and physicians are responsible for perpetuating error and ambiguity in using the single word *pyorrhea* to indicate what is technically and pathologically *pyorrhea alveolaris, gingivitis,* or preferably *ulitis.* While there may be some excuse for dental misapplication of medical terms, the physician should know that *pyorrhea* only means a flow of pus. Like *gonorrhea* and *blennorrhea,* the word contains nothing to indicate the origin or exit of the discharge.

(18) Specific Granular Epipephycitis: The word *trachoma* is employed by every ophthalmist in the world, and has been accepted as correct by the Health Department of the United States Government, yet it has no etiologic nor pathologic significance. Literally interpreted, *trachoma* merely means something which is rough, and the word has no reference whatever to the ocular apparatus. Rose, of New York, suggested the name *epipephycitis* as the correct pathologic designation, to which the writer would add the qualifying terms "specific" and "granular" as a means of differentiation between simple and specific conjunctivitis. The word trachoma is a misnomer and should be discarded.

(19) Ophthalmitis: While the suffix *itis* denotes inflammation wherever and however employed, and the eye is technically the *ophthalmus,* yet the term in common use to represent inflammation of the eye is *ophthalmia.* When and by whom the word was introduced into medical nomenclature cannot be determined with certainty, but as pathologically applied it is inexact and *ophthalmitis* should be substituted.

(20) Nyctalopia: Another curious and apparently inexcusable misapplication by ophthalmists is the use of the word *hemeralopia* to represent so-called night-blindness, whereas the converse is literally true, i. e., *hemeralopia* signifies day-blindness. Based upon the derivation of the term, the correct designation for night-blindness must be *nyctalopia,* although the word does not appear in any text-book examined,—*hemeralopia* being invariably used.

Quite recently the writer exhibited the temerity to substitute *nyctalopia* for *hemeralopia* in a scientific dissertation which was being revised and rewritten for a prominent local ophthalmist, and was severely criticized therefor. During the argumentation which followed the specialist was induced to admit that the literal meaning of *nyctalopia* was night-blindness; nevertheless he insisted upon using *hemeralopia* just the same!

THE USE OF THE ANGIOTRIBE FOR THE RADICAL CURE OF HEMORRHOIDS AND IN THE TREATMENT OF RECTAL PROLAPSE.

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The method here presented has been employed by the author in more than one hundred cases and has given such uniformly good results that it merits general recognition. The operation is executed under spinal or local anesthesia with a preliminary hypodermatic injection of morphine and atropine. If local anesthesia is employed, a thorough infiltration is necessary in order to secure maximum dilation of the sphincters.

All hemorrhoidal structures are grasped with ordinary artery forceps, and a few (2 or 3) c.c. of a one per cent. solution of quinine-and-urea hydrochlorid are injected into the base of the pile structures. All the piles having been injected, a blunt curved needle, armed with a linen thread, is passed through the pile as close to the forceps attached to it as possible; the needle is withdrawn and the free ends of the thread are securely knotted to prevent slipping. Traction is now made on the thread to bring the pile into good view and the blades of a strong angiotribe are applied around it and are securely locked so as to completely crush the pile. The angiotribe is left on the pile for about one minute and then carefully removed without pulling on the tissues. The knotted linen thread is now removed. All the piles are crushed in this manner but not cut away; no rubber tubing is placed in the rectum after employing the crushing method.

The patients operated upon by this method suffer no post-operative pain or inconvenience. The tissues crushed with the angiotribe are transformed into a ribbon-like structure so thin that it is almost transparent: it slowly disintegrates and disappears in about one week.

The quinine injected produces an anesthesia that lasts for several days and by the time the sensation returns a cure has been accomplished. No case of injury of the sphincter was observed, a thing that was often noted when the old methods of chloroform, cautery, and forcible divulsion of the sphincters were employed.

Prolapse of the rectum can be treated in a similar manner. Grasp the prolapsed tissues with artery forceps attached at four points bringing them on a stretch; apply the blades of the angiotribe around the prolapse, parallel with the axis of the rectum, one blade on each side of the prolapse, so that the point of the blades rests in or near the anal opening, and crush *ad maximum* along the lines indicated by the points of traction; now divide the crushed tissues along the middle line of the ribbon produced by the crushing. This divides the prolapse into four quadratic sections or flaps. The angiotribe is next applied to each of these four flaps at their base, but this time at a right angle to the axis of the rectum, and pressure is applied. The angiotribe removed, the flaps are severed along the middle line of the impression made by the crusher.

All flaps having been removed, an irregular quadrilateral-shaped white line of compressed tissues is seen and a continuous suture of fine catgut is made to firmly unite the tissues compressed along this line. Finally a few c.c. of a one per cent. quinine solution are injected into the tissues in a circular manner and external to the line of sutures. This will prevent post-operative pains as in the operation for the simple crushing of the pile structures; no rubber tubing need be placed in the bowel; no open wounds have been made upon the rectal wall; nor has any blood been spilled, a thing which is of much importance in very anemic patients.

REPORT OF A CASE OF AN OTITIC ABSCESS OF THE BRAIN.*

John Guttman, M.D.,
New York.

Owing to the greater attention that is being given nowadays to chronic suppurations of the middle ear, intracranial complications are not very common. The occurrence of a brain abscess as a result of such complications is comparatively rare, and warrants a more or less detailed report.

S. M., 35 years old, consulted me for the first time on July 14, 1918, complaining of severe headaches and vomiting, which his family physician ascribed to a gastritis. Having had an ear discharge for the preceding sixteen years, the patient himself suspected that his headaches might bear some relationship to the discharging ear.

There was foul smelling pus in the ear with soft red granulations protruding from the upper and posterior wall of the tympanic cavity. Hearing $V = l^{1}h = o$. The caloric test showed a functioning labyrinth. Evidently the granulations were not attached to the labyrinthine wall.

In order to facilitate drainage, I removed some of the granulations; there was no difficulty in doing this and the patient did not experience any pain during their removal. This was followed by great relief, which lasted for three days; on the fourth day he returned to my office with a temperature of 103°, severe headache and drowsiness.

He was immediately sent to the hospital, where I performed a radical mastoidectomy. The cortex of the mastoid was found sclerosed, practically no cells being encountered. The antrum and tympanic cavity were filled with foul-smelling cholesteatomatous masses; the tegmen antri seemed perforated with drops of pus oozing through the opening; the opening was widened and two ounces of very offensive-smelling pus, evidently under pressure, gushed out from the enlarged opening. The drum beneath was covered with reddish granulations. The radical operation was then completed and the wound was closed.

The following day the temperature dropped to 99°, the sensorium became clearer and the drowsiness considerably diminished. The next day, temperature 99°, sensorium not as clear as the day before. Babinski, Kernig and Brudzinsky phenomena were present. The cerebro-spinal fluid was under great pressure and microscopically showed evidences of meningitis; the exact bacterium could not be determined culturally. Diagnosis: meningitis. This was corroborated by Dr. E. D. Friedman.

On July 22nd, the temperature rose to 100.1°; sensorium clouded. July 23rd, the wound was reopened, and the dura was found bulging but not pulsating. Thereupon I decided to explore the brain; and accordingly entered the lower gyrus of the temporal lobe. About two ounces of "cadaverous" smelling pus was evacuated from a cavity the size of a small orange. Decomposed brain matter was evacuated with the pus. During this, the patient stopped breathing, and artificial respiration had to be resorted to. After a considerable period, respiration was re-established and the patient was removed from the operating table, but six hours later the temperautre rose to 105°, and he died.

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*Read before the Section on Otology, New York Academy of Medicine, May 9, 1919.

Some of the interesting features of this case are:

1. At the onset of the disease the patient was treated for gastritis; the vomiting and headache being attributed to disease of the stomach.

2. The course of the affection was probably the following: cholesteatomatous masses broke through the tegmen antri, forming a chronic brain abscess. This was quiescent, and having produced no symptoms the patient did not seek relief until the abscess caused meningeal irritation.

3. The removal of polyps from the ear even when they are not attached to the labyrinthine capsule may flare up a "slumbering meningitis."

4. The stoppage of breathing during the operation was due to temporary interference with the circulation in the medulla, most probably on account of the sudden change in the intracranial pressure, after the evacuation of the pus.

Letters to the Editor

San Francisco, May 24, 1919.

Editor, American Journal of Surgery:

I should like to call attention to certain points in the discussion of *The Factors to be Considered in Determining Whether to Extract or Conserve Diseased Teeth* in the May number of the American Journal of Surgery; for while Dr. Hartzell does not mention my article in a previous number, some of his statements might be taken as contradictory to mine.

In the first place, we should remember that while I was dealing definitely with dead teeth, Dr. Hartzell deals with what he terms rather vaguely *diseased* teeth.

It is true, of course, that "individuals who advocate complete destruction of dental organs in order to rid the body of streptococcal growth, * * * evidence profound ignorance." But it is also true, on the other hand, that complete removal of dead teeth and underlying areas of infection will rid the body of dangerous and sometimes fatal sources of streptococcal growth, that such sources cannot be removed by any amount of tooth washing or grinding or polishing, and that such sources often cannot be removed by simple extraction followed by curreting.

In the statement, "where teeth must be devitalized, such devitalization should be done under exactly the same kind of surgical asepsis, as is demanded of surgery of the brain or abdominal cavity." Dr. Hartzell shows that he is unwilling to accept my statement that all teeth devitalized under careful surgical asepsis show evidence of putrefaction and infection within six months of the time of devitalization. The truth of my view can easily be verified by experiment. Would it not be advisable for other men to offer definite evidence rather than their general opinions, if they are unwilling to accept my view?

Moreover, I have pointed out that some of the cases of pyorrhea, in which Dr. Hartzell is specially interested, are caused by dead teeth and will not be cured so long as the dead teeth remain in the jaws.*

According to the article on Diseased Teeth, "an individual with a full complement of red cells, * * a normal digestion, a normal urine, and a reasonable amount of energy, is safe in conserving any of his dental organs which might present for treatment." The meaning of *safe* here is rather indefinite. If we take *safe* in the ordinary sense of the term, the quotation is equivalent to such a statement as the following: A man with a lighted bomb in his pocket is perfectly safe. The fact that a dead tooth had not affected a man so as to put him among Dr. Hartzell's 182,850 persons in our country who died in 1916 from heart disease, does not indicate that the dead tooth will not affect the man. The man will not be safe so long as the dead tooth and the involved bone underlying it are allowed to remain. Very truly yours,

Josef Novitzky.

Minneapolis, Minn., May 20, 1919.

Editor, American Journal of Surgery:

Thank you for the very nice editorial in the American Journal of Surgery for May, in relation to my article on Local Anesthesia in Children. I might call your attention to one rather "healthy" mistake made in this editorial. The word I used in the article was "stealthy" not "healthy." Healthy is pretty good, but stealthy is better. In this instance it has an entirely different meaning.

Very sincerely yours,

R. E. Farr, M.D.

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* Septic Teeth; Their Etiology and Surgical Treatment. American Journal of Surgery, August and September, 1917.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, AUGUST, 1919

SHOCK.

The war provided abundant opportunity for the study of wound shock, and it was studied both clinically and—in the British and American armies—experimentally. As the result of these and earlier observations certain phenomena are known to occur in surgical shock. These, as summarized by Professor Cannon in his discussion at the meeting of the Société de Biologie, October 19, 1918, are: 1. persistent low arterial pressure; 2. concentration of corpuscles in the capillaries; 3. fall in the body temperature concomitant with the fall in blood pressure; 4. reduction of the alkali reserve in the blood (sodium bicarbonate) often sufficient to amount to an acidosis; 5. a correspondence between the reduction of the alkali reserve and the fall in the blood pressure; 6. damage to the circulatory control when the low pressure has lasted a long time; 7. a marked sensitiveness to ether or chloroform anesthesia, which dangerously reduces the already low blood pressure; 8. tolerance of nitrous oxid and oxygen as an anesthetic.

In spite, however, of our familiarity with these facts it cannot be said that we have approached much nearer to a knowledge of the mechanism of shock. The various theories that have been advanced from time to time have all thus far failed of satisfactory proof by laboratory experiments or by therapeutic tests. Cannon has been advancing the theory, based on cat experiments, that traumatic shock is due to absorption of toxic material from traumatized tissues. In these experiments, carried out with the English physiologist Bayliss at the A. E. F. laboratory center in Dijon, he found that the condition is independent of infection (the muscles were traumatized without breaking the skin); that it is not of nervous origin (it occurred even when the nerves were severed); and that fall in the blood pressure did not take place if the vessels were constricted by a proximal tourniquet, thus indicating that the absorption is into the circulation. Like other hypotheses of shock, Cannon's is yet to be proved. Crile rejects it as altogether faulty, and stoutly maintains his own theory. Discussing Cannon's recent paper at the convention of the American Medical Association (see *Journal of the A. M. A.*, July 19, 1919) he said:

> "Patients with extensive wounds of the extremities to which tourniquets had been applied so that the blood supply of the injured part was so completely blocked that no tissue poisons could have been introduced into the circulation, have passed into shock and have died from shock. Patients have died during operations from shock in which a tourniquet has completely controlled the circulation of the blood of the injured part. The tourniquet does not block nerve impulses; it does block circulation. Nerve blocking does prevent shock."

As the mechanism of shock has thus far failed of demonstration, so too a specific therapy has eluded development. Bayliss' intravenous infusion of gum-saline solution was hailed as a means of restoring blood pressure but, though many assert its beneficence there are at least as many more who condemn it as of little value or even as distinctly dangerous. In spite of all the study that has been devoted to shock, both by surgeons and by physiologists, we have thus far arrived at no better plan of treatment—upon which, however, all agree—than the application of heat, the administration of small doses of morphine and—in cases associated with hemorrhage—the transfusion of blood. Among battle casualties much of the shock was due, it would appear, to fatigue or exhaustion and to lack of food. In these cases, especially, hot drinks were also helpful.

MEDICAL NOMENCLATURE.

We have departed somewhat from the usual character of our original contributions to publish, in this issue, the suggestive and informative paper on "Medico-Literary Misapplications and Ambiguities." The author, Charles C. Mapes, is a purist in English diction, a stylist in medical composition, a stickler for precision in scientific words and phraseology.

We share his respect for elegance and accuracy in rhetoric and for the proper use of words, scientific and other. Thus we accord with him in objecting to the expression "gonorrheal endocarditis," as quite improper and without the sanction of usage among careful writers. We cannot follow him, however, in protesting against *gonococcal endocarditis* or the terms *gonococcus* and *gonorrhea,* however much the things they denote differ from what the etymology of the words (which, after all, is of no practical importance) might indicate.

There are thousands of words, both in technical nomenclature and in common speech that have their origin in metaphor, in fancied resemblances, in mistaken notions of the source or uses of the thing named, or even in pure slang. Yet they are perfectly good words for they are understood by everybody. Language grows; it cannot be made by dicta. The time to protest against an ill-made term is when it first appears, not after it has been in general use for centuries. Achilles Rose inveighed long and vigorously against hybrid Latin and Greek terms and other philologic monstrosities in medical nomenclature. But he cried out in vain: everyone knows what *trachoma* means, but few have heard of and fewer use *epipephycitis.* The scholarly Frank P. Foster insisted upon spelling the eponymic terms *faradization* and *Fallopian* as *faradaization* and *Falloppian,* but usage has not followed his direction. *Bladder, jaundice, circumcision* are words that are well understood wherever English is spoken. To attempt to replace them with *urocyst, choloplania* and *posthectomy* is not only foolish but confusing and, indeed, it smacks of pedantry. Such efforts are bound to be futile and the chief result of them is to make their authors unhappy.

Mapes is doing a useful service, however, in calling attention to the descriptive inaccuracy of many medical terms, for he may thus help us to be more careful in the manufacture of new words made necessary by fresh medical discoveries. He is right, too, when he objects to the distortion of words beyond their accepted meaning.—there is, of course, no such thing as *partial anuria,* yet one may properly say that a patient is *almost anuric.*

Medical manuscripts abound in far greater sins than *partial anuria* and *gonorrheal endocarditis.* We would not here attempt to enumerate a tithe of them; but we must protest again against such expressions as "a chronic appendix," "an acute abdomen" and "the patient had no temperature." However acceptable such phrases may be in the slang of the hospital ward they are utterly unpardonable in a medical address or on the printed page.

ABRAHAM JACOBI.

The passing of the venerable Abraham Jacobi is a very real loss to the profession beyond even that of the inspiration of his presence, for in spite of his advanced years he was still active in affairs that concerned scientific medicine, public health, and civic betterment. Indeed, the militant activity of this old man might put to shame many of his younger colleagues who had not earned, as he had, the right to rest from labors in the public welfare.

A grateful profession, proud of the best medical library in the world—that of the Surgeon General of the Army in Washington—should not forget that it was largely through the efforts of Jacobi that the appropriation was secured from Congress, in 1880, to print that most important medical bibliography, the Index Catalogue of this library, upon which Billings and Fletcher had labored for several years.

Nor is surgery itself without debt to Jacobi. Among his many original clinical observations in pediatrics will be found not a few of surgical significance and importance.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

IS SYPHILIS INCREASING?

The examination of the death rate attributable to syphilis shows an apparent gradual increase of recorded deaths from the cause. With a rate of 4.1 as the average from the years 1906 to 1910, one notes progressively the increase to 7.2 in 1913; 7.9 in 1914; 8.6 in 1915 9.6 in 1916. It is similarly noteworthy that the percentage of deaths from syphilis under the age of one year in the Registration Area as of 1910, exclusive of North Carolina, as compared with the total death rate, has risen from one per cent in 1910 to 1.3 per cent in 1916. The mortality rate in infancy from syphilis is higher than that due to scarlet fever, diphtheria, influenza, and tuberculous meningitis, though these represent infections for which there is much concern and towards the reduction of which efforts have been made.

In a most excellent volume by Dublin, Kopf and Van Buren on "Mortality Statistics of Insured Wage Earners and Their Families," published by the Metropolitan Life Insurance Company, appears the experience of that company in its Industrial

Department, 1911 to 1916, in the United States and Canada. In an analysis of the vast amount of material, there is developed a comprehensive study of the mortality of wage earners and their families, with the exception of figures of children under one year of age, which are not classed as insurable. The virtue of the volume lies in its supplemental information concerning large areas of the country still remaining outside the registration area of the United States. The extensive facts revealed in this report are of unusual value because of the painstaking care which has been employed in their compilation and the definiteness of information concerning policy holders which is available for life insurance companies and generally unrecorded in ordinary data secured through public agencies.

Syphilis possessed a death rate of 8.7 in the experience of the Metropolitan Life Insurance Company during the six year period of 1911 to 1916. Admittedly, this figure is entirely inadequate because of the general tendency to conceal the existence of syphilis as a cause of death. To illustrate, in the original records of deaths submitted to the insurance company, syphilis was given as a cause in 2345 instances, but after careful inquiry and investigation, the number of deaths was finally recorded as 4659, almost a one hundred per cent. increase. It is because of this that the statistical facts concerning death presented by the insurance company probably are more nearly correct than those tabulated in the routine death records compiled by departments of vital statistics of the states within the registration area. The benefits of this effort toward more accurate certification are further exhibited by the fact that the mortality rate for syphilis in the industrial experience was 3.4 in 1911, and 11.9 in 1916. It is obvious that the disease itself has not increased in virulence to this extent, but that the apparent increase in the death rate was due to greater efforts in the direction of accuracy.

It is undeniable that the published death rates for syphilis are increasing, but this is by no means indicative of the fact that syphilis itself is more widespread or more virulent than during previous years or decades. Osler long ago remarked "of the killing diseases, syphilis comes third or fourth." This conclusion was based upon an appreciation of the causal relations between syphilis, locomotor ataxia, paresis, aneurisms, and numerous cardiovascular diseases thus far separately classified in the International List of Causes of Death. The effect of combining these items is evidenced in Metropolitan experience by a general mortality rate from syphilis, for example, from 1911 to 1916 of 8.7, but a mortality rate of 14.3 if there are to be included locomotor ataxia, general paralysis of the same.

Downing estimated the mortality from syphilis to be about one in every 18 deaths, basing his conclusion upon the figures of Massachusetts. This would place syphilis in point of fatality fourth in the list, and only surpassed by tuberculosis, pneumonia and cancer.

Metropolitan tables point out, likewise, very significant differences between the mortality rates from syphilis classified by color and sex. The death rate among colored males and females is invariably higher than for deaths from this cause among the whites, and the mortality rates for the males is considerably higher in each group than that of females. To make it concrete, the general mortality rate from syphilis covering the six years was 8.7, the mortality rate for white males was 9.3, white females 3.9, colored males 32.4, colored females 18.7. Incidentally, it is noted that there is a gradual increase in the recorded mortalities, both males and females, whether white or colored.

These mortality figures of syphilis are striking, but their true significance cannot be determined until there is a wider knowledge concerning their relative value compared with the general figures for deaths from syphilis that are now so carefully hidden behind other official causes of death. Furthermore, the true meaning of these figures cannot be grasped, save as one rcognizes the age period at which the syphilitic mortality is most marked. Leaving aside the problem of infant mortality, syphilis plays a comparatively small part in mortality until after the nineteenth year. Beginning with age twenty, there is a continuous increase in the mortality from syphilis throughout the middle period life, and even extending into old age. One may indeed properly ask what influence has syphilis upon the increasing death rate of persons above the age of forty years? Experience has demonstrated that the death rate for syphilitics over the age of forty is approximately twice that of known syphilitics. In addition, the pronounced effects of luetic infection upon the heart, kidneys and blood vessels may undoubtedly be responsible for the growing increase of mortality due to diseases of the cardio-vascular-renal system, now challenging the attention of workers in public health.

Patently, the figures regarding syphilis merit careful scrutiny, and provision should be made for determining some factor of approximation which will enable the profession to interpret the actual cause of death in many conditions now recorded inaccurately in some column other than that headed syphilis. The mortality figures for the registration area by no means afford the accuracy that can be furnished by our large industrial insurance companies, which are desirous of securing the facts concerning death as a means of determining various questions arising in connection with actuarial problems. Syphilis will undoubtedly show an increase in its statistical figures for many years to come, but this must not be misinterpreted as due to the spread of the disease, but rather to more careful classification and more scientific diagnosis. The more carefully the cause of death is defined the larger will be the part chargeable against syphilis. Thus far there is no evidence to prove that it is any greater menace than hitherto. The world is entitled to know, however, just how much disability and death is directly and indirectly due to the pestilential spirochete of venery.

Progress in Surgery

A Résumé of Recent Literature.

Gunshot Fracture of the Femur. J. R. Buchbinder, Chicago. *Surgery, Gynecology and Obstetrics,* July, 1919.

Buchbinder emphasizes the superiority of the Steinmann nail over any other form of extension in fracture of the femur. It is far more dependable, and needs less weight than adhesive traction. It permits complete exposure of the thigh at all times for dressings without disturbing the fragments, and allows complete mobility of the knee-joint.

The associated wounds in compound fracture of the femur should be excised and sutured immediately where possible. Where primary suture is not feasible, the wound should be sterilized and closed early.

The Treatment of Supracondylar Fractures with the Steinmann Clamp (*Traitement des Fractures sus condyliennes par la Broche de Steinmann*). H. Fresson and R. Toupet. *Revue de Chirurgie,* May 1919.

These authors present a series of cases of supracondylar fractures of the femur, treated with indirect extension and direct extension by means of the Steinmann nail. They agree with Depage that "supracondylar fractures are the most serious from the standpoint of late results because of the difficulty in maintaining the fragments in normal coaptation. The lower fragment is always displaced posteriorly and there is no apparatus which has up to the present effected a complete reduction." The authors present an elaborate discussion of the mechanics involved, and the method of procedure. The operation is performed under local anesthesia, and either a single nail or two half-nails are inserted into the condyles. The point of insertion should be at the junction of two lines—one, the prolongation of the long axis of the femur, the other horizontal, passing along the posterior border of the condyles. The traction should be enough to slightly over-correct the deformity, usually about ten to fifteen kg. The length of time that the nail remains in place varies from 9 to 60 days.

The nail is easily withdrawn and very well tolerated by the patient. The results have been excellent. The authors have treated by this method 324 supracondylar fractures, of which 18 were united and walked, 11 were united and discharged in plaster for military reasons, one was evacuated reduced but not united.

After a long experience in the treatment of fractures of the femur, and the employment of all methods known, the authors believe that the best treatment of supracondylar fractures is traction on a nail placed as described. It is the best tolerated form of traction, and in their cases the only complication was an hydrarthrosis.

Fracture of the Femur. Kenneth Bulkley and Donald B. Sinclair. *Annals of Surgery,* May, 1919.

The following conclusions concerning compound fracture of the femur were arrived at after observation of a large number of cases at the Red Cross Hospital at Neuilly, France:

1. Cases should be held at advance stations for one month, or be given preference and sent immediately to stations in the rear, not more than 24 hours distant. Operation must be immediate.
2. The chief danger lies in infection—gas gangrene in early weeks, streptococcus in later weeks.
3. Fractures involving hip or knee joints are infinitely more serious, usually requiring amputation.
4. The primary operation should be radical to the point of brutality.
5. Amputations should be performed earlier and oftener.
6. Traction should be skeletal; femoral traction is superior to tibial.

The Treatment of Purulent Arthritis by Wide Arthrotomy, Followed by Immediate Active Mobilization. Dr. C. Williams, Ghent, Belgium. *Surgery, Gynecology and Obstetrics,* June, 1919.

Williams advises wide arthrotomy with immediate mobilization and active motion in *all* cases of purulent arthritis, not associated with displacement of bones. The motion must be active, not passive. He believes that this is the only method which provides adequate joint drainage, because during active motion of joints, the pus in various recesses is expressed. He emphasizes the fact that motion is not painful, and in fact that it often relieves pain by promoting evacuation of pus from areas of retention. Records of ten cases of infection of elbow and knee, treated according to this method, showed excellent results, with preservation of articular function.

A New Method of Treatment for Suppurative Arthritis of the Knee Joint. Major J. Elveridge. *The British Journal of Surgery,* April, 1919.

Elveridge is an exponent of the mobilization treatment in suppurative infection of the knee joint. Instead of the usual vertical incisions on either side of the joint, he employs transverse incisions, about one and one-half inches in length, commencing on either side of the patella and extending horizontally outward and inward. The cut edges of the synovial membrane are sutured to the skin. Active motion is carried out at first with the aid of specially devised apparatus, later without the apparatus. His summaries and conclusions are as follows:

1. All surgical methods of draining the knee joint have certain drawbacks.
2. The physiological method described above endeavors to provide:
    (a) A circulation of the synovial fluid.
    (b) Free drainage for pus.
3. The practical requirements for the treatment are:
    (a, Free outlets for fluid from the joint.
    (b) Active movements.
4. In about 50% of the cases treated, a useful joint has been obtained.
5. In the absence of extensive bone injury—which of course negatives this treatment—provided the physiological method is established early, resolution is hastened,

and tracking is rare. Collections of pus in the popliteal space occur frequently.

6. The method is impracticable if its adoption be delayed until the establishment of the fulminating stage of suppurative arthritis.

A Simple Splint for the Treatment of Fractures of the Clavicle.

RUSSEL L. HODGE, Base Hospital 28, A.E.F. *The Journal of Orthopedic Surgery,* July, 1919.

Hodge describes a new and effective splint, applicable for fracture of either one or both clavicles. It consists of two pieces of wood, nailed together in the form of a T. This splint thoroughly padded is placed with transverse portion extending along the upper border of the scapulae, while the vertical portion follows the line of the spine down to the sacrum. The transverse piece is about 20 inches long, the vertical piece about 23. The transverse piece is fixed by a figure-of-eight bandage under the axillae and around the back of the neck, the vertical piece is fixed by a bandage around the abdomen. The advantages of the splint are thus enumerated:

1. The splint is suitable for both bilateral and unilateral fractures.
2. The application of the splint reduces the fracture painlessly.
3. The arms are left free and thus muscular atrophy is avoided.
4. The patient can use the arm on the injured side for any ordinary purposes, such as writing, feeding himself, etc.
5. Accurate apposition of the fragments of the bone is obtained.
6. Open wounds are easily accessible for treatment without disturbing the apparatus.

A Note on Potts' Disease, and Albee's Spinal Graft.

G. R. GIRDLESTONE, Oxford. *The Journal of Orthopedic Surgery,* July, 1919.

The author's report is based on fifty consecutive cases. The special value of the operation lies in the fact that it tends to give permanent immobility in the corrected position, a greatly reduced period of confinement in bed, and a safeguard against recrudescence of the disease. The contra-indications are (1) cases under three years of age, (2) disease of the occipital and axial regions, (3) cases in the active stage of the disease, (4) the presence of a sinus or other septic focus near the site of operation. Cold abscess is not a contra-indication if the operation can be performed without opening it.

The pre-operative treatment consists in splinting, reduction of the deformity, and general treatment. The method of splinting and reduction depend upon the location of the disease, and different methods must be used, according as the disease is lumbo-sacral, low lumbar, high dorsal and cervical, or mid-dorsal, low dorsal, dorso-lumbar, and high lumbor.

The technic is described in detail. In the operation the author attaches much importance to the use of ether rather than chloroform, the warmth of the theater and the table, the complete avoidance of hammering. The results have been excellent. Detailed reports of cases are appended.

Results of the Surgical Treatment of Spinal Cord Tumors.

A. W. ADSON, Rochester, Minn. *Minnesota Medicine,* June, 1919.

Adson presents a series of sixteen cases, in which laminectomy was performed for the removal of cord tumors. In thirteen of these cases tumors were found, and eight of these were removable. Of these eight, three patients have completely recovered, two are greatly improved, two slightly improved, and one has a recurrence. There were no deaths. He makes a plea for more frequent exploratory laminectomies, especially in cases where the diagnosis is doubtful. He urges more careful neurological examinations in all spastic paraplegias, and believes that if a patient presents sufficient suspicion of a cord tumor, he should be given the benefit of exploratory laminectomy.

The Longitudinal Sinus: Its Adaptability in Procuring Blood for Diagnosis, Its Use in Transfusion of Blood and for Diagnostic Purposes—An Ideal Method in Infancy.

LOUIS FISCHER, New York City. *N. Y. State Journal of Medicine,* May, 1919.

Fischer presents the following facts concerning the use of the longitudinal sinus in infants.

1. The sinus route is safe and easily accessible. Its large caliber is well adopted for both procuring blood rapidly when a Wasermann reaction is needed or when intravenous medication is to be given.
2. The site is especially indicated for rapid transfusion in marantic children.
3. The stock incident to exposing a vein, however slight, is avoided.
4. Salvarsan injections are very easily given through the sinus.
5. When toxic diphtheria requires the most rapid administration of antitoxin, the sinus route is most advantageous.
6. When a warm saline injection is indicated 50-100 cc. can easily be added to the circulation.
7. When blood-letting is indicated, the sinus route offers the most convenient place for depletion.

Sacral Anesthesia. *A Preliminary Report.*

PARKER LYONS, New York. *Medical Record,* June 14, 1919.

For operations about the perineum, rectum and anus, Lyons advises sacral anesthesia in preference to general or local anesthesia. Anesthesia is complete and satisfactory in all cases, when the technic is properly carried out. It is not a spinal anesthesia as the fluid does not penetrate into the spinal canal.

The method is that described by Thompson of Galveston, Texas. The needle is introduced into the sacral canal, which is found usually a short distance above the upper end of the coccyx. The needle after touching the bone, by manipulation finds its way into the hiatus sacralis. It is then plunged through the fibrous membrane covering the canal, in a direction parallel to its axis. After determining that the needle is not in the spinal canal or in a bloodvessel, 30cc. of novocain solution (6 grs. to the ounce) are injected. There should be no resistance to the flow of fluid. Anesthesia is complete in twenty minutes and lasts two or three hours.

Surface Temperature in the Diagnosis of Surgical Abdominal Conditions.

M. E. ALEXANDER, Waterbury, Conn. *N. Y. Medical Journal,* June 21, 1919.

Surface temperature can be determined by folding the skin over the bulb of an ordinary clinical thermometer, and reading it after three minutes. It should be compared with the opposite side.

In surgical conditions of the abdominal viscera, except the kidneys, there is no elevation of temperature of the skin overlying them.

In unilateral inflammation of the kidney there is frequently a localized elevation of surface temperature.

In seventy-four per cent. of kidney cases examined (unilateral suppuration), the surface temperature of the affected side, was 1° F. or more higher than the unaffected side.

In advanced tuberculosis of the kidney, the surface temperature may be lower than on the unaffected side.

Determination of surface temperature may be considered an aid in the diagnosis of unilateral kidney suppuration.

Umbilical Teratoma.

BARNEY BROOKS, St. Louis. *Annals of Surgery,* June, 1919.

Brooks reports a case of teratoma of the umbilicus in a child aged two years and four months. The tumor replaced the umbilicus and was capped by an ulcer, exuding a thin watery discharge. Microscopically the tumor was composed of tissues corresponding to those forming normal intestine. Peritoneum, muscle, nerve cells, lymphoid nodules, and mucosa were present in their normal relations. In the wall of the tumor there was a small island of normal pancreas.

Inflammatory Stenosis with Cardiospasm. (*Sténose inflammatoire avec spasme du Cardia: Cardioplastie, Guerison*). M Lecène. *Paris Medical*, May 10, 1919.

Lecène reports a case of cardiospasm which led to repeated attacks of regurgitation and to a state of inanition. He exposed the abdominal portion of the esophagus by a long incision parallel to the left costal margin. He was able to see the cardia clearly and draw into the abdomen the lower part of the esophagus. The esophagus was narrowed just above the cardia. He incised all coats and performed an esophagoplasty. The patient made a perfect recovery and eighteen months later radiographs showed the normal passage of bismuth through the esophagus.

Cholecystitis Following Typhoid Fever in Childhood. Harry C. Deaver, Philadelphia. *Annals of Surgery*, May, 1919.

The case reported is that of cholecystitis in a girl, five years old, during convalescence from typhoid fever. The hay bacillus was found. Cholecystostomy was performed with complete recovery.

Hemolytic Icterus, A Report of Two Splenectomized Cases. J. P. Schneider, Minneapolis. *Minnesota Medicine*, June, 1919.

Schneider presents two cases of acquired hemolytic icterus, with typical splenic crises, severe vomiting and headaches followed by distinct and persistent jaundice. One of these cases was complicated by gall-stones. Splenectomy in both patients effected a complete cure. Schneider agrees with C. A. Elliot's summaries published in July, 1915, viz.: splenectomy is a cure for hemolytic jaundice; the mortality is 4.1%; severe cases should all be operated upon; gall-stones complicating 60% of these cases should be removed later.

The Experimental Production of Pancreatitis in Animals as the Result of the Resistance of the Common Duct Sphincter. Edward Archbold, Montreal, Canada. *Surgery, Gynecology and Obstetrics*, June, 1919.

Archbold reviews literature bearing upon the existence of a sphincter at the opening of the common bile duct. This sphincter was originally described by Oddie in 1887 and 1888. Archbold proves experimentally that overaction of the sphincter may cause retrojection of bile into the pancreas, and believes that this accounts for many cases of pancreatitis, in which no gall stone or infection of the biliary tract is found. He was able to produce in animals acute hemorrhagic pancreatitis, by allowing various substances, such as bile infected with organisms, human bile from a cholecystostomy, solution of bile salts, to flow into the gall-bladder (of the animals experimented upon), at a pressure of 500 m.m. He also produced other lesions such as general increase in the size of the pancreas, and in its hardness and subacute pancreatitis, by varying the pressure and substances used.

The above evidence lends considerable physiological support to the treatment of pancreatitis by drainage of the gall-bladder.

Appendicitis with Abscess and Diffuse Peritonitis: Results of Operation in 100 Cases. G. Paul Larroque, Richmond, Va. *Virginia Medical Monthly*. July, 1919.

Results—There were three deaths in the 101 cases. One man with appendicitis and a large hole rupture with diffuse peritonitis died with signs of paralysis of the bowel seven days following operation. Two boys almost moribund, with profuse cathartic peritonitis, died, one within three hours and the other within thirty-six hours after operation. Ninety-seven cases of abscess including twenty-two with diffuse peritonitis were saved. They remained in bed from twelve to eighteen days.

There were two cases of femoral phlebitis, both in men and both in the right thigh.

Wound infection and hematoma have not occurred in abscess cases. Most wound infections are the result of breaking down of small collections of blood beneath the skin and fascia. This has not been observed in drainage cases. One case was followed by an annoying sinus of the abdominal wall. This patient was a woman with a large abscess and pelvic disease operated upon through a midline incision.

Three of the 101 abscess cases developed fecal fistula following operation. One was a boy with abscess of two weeks' duration complicated by gangrene of the cecum. The fistula healed in 3 weeks. The other two were in patients who had coincident tuberculosis of the bowel.

There were four cases of dilatation of the stomach promptly relieved by lavage.

Two children in acidosis stupor were promptly relieved by soda water per rectum.

Several cases had pneumonia and bronchitis before operation. These were cured by the operation. None developed respiratory disease after operation.

There has been no post-operative obstruction, no hemorrhage, or secondary peritonitis or abscess, no anesthetic disasters, no catastrophies.

Concerning post-operative hernia, Laroque considers every case which has to be drained as having a rupture of the abdominal wall as soon as the operation is performed, and instructs every patient to report if a hernia should occur. Only one has so reported but it is quite certain that others have a hole in the belly wall. The opportunity to re-examine, at the end of three to six months, a large proportion of the cases which had to be drained and failure to find but one case, leads to the belief that post-operative hernia is exceedingly rare following the muscle-splitting incision, even if drainage has to be employed, provided we use small instead of large drainage tubes and carefully place sutures between the tubes when more than one is employed. It would be instructive if the number of post-operative herniae following operation for abscess by surgeons could be compared with the number of cases of hernia following operation in clean cases in the patients who live after operation by inexperienced doctors.

An Experimental Study of Abdominal Adhesions. Moses Behrend and Norman S. Rothschild, Philadelphia. *Pennsylvania Medical Journal*, June, 1919.

The authors present a very interesting study of the causes and treatment of post-operative abdominal adhesions. In twenty-nine primary operations on rabbits, they found that the extent and number of adhesions varied considerably with the local skin disinfectant that was used. They used iodine, alcohol, and dichloramine T-ether as disinfectants. After the use of alcohol all cases showed adhesions; after iodine only one case did not show adhesions; after dichloramine-T only two cases *did* show adhesions. After use of iodine the adhesions are thick and dense; after alcohol they are filmy, while after the use of dichloramine-T, they are exceedingly thin.

As regards cure of adhesions, after their separation or division in secondary operations, the authors found that the use of mechanical substances such as rubber dam or Cargile membrane placed between the adherent surfaces was an absolute failure. Dichloramine-T spread over the adherent surfaces gives the best results. Sodium citrate, salt solution and ether cannot be recommended.

Alternating Periodic Ovarian Swellings. Emil Ries, Chicago. *Journal of the American Medical Association*, July 12, 1919.

In the condition Ries calls alternating periodic ovarian swelling the patient goes to one physician who tells her she has an ovarian cyst on the right side needing operation; after a few days she consults a second one, who assures her she has no tumor at all; confused, she goes to a third, who examines her and says she has a tumor on the left side. In a case of this kind which came to him, this type was suspected, and he advised against operation. He first described it in 1913, and it has been studied in over a dozen cases since 1906, in three of which he has operated. A number of others were observed in which the condition was present in a rudimentary way. The three operative cases are reported and the pathologic conditions described. In Case I the patient had had thirteen right and seven left swellings, and various pathologic conditions for which the ovaries were removed. He concludes that if a patient with these symptoms has been observed a sufficient length of time to establish the diagnosis and suffers considerably, but for some reason should not be operated on, the intentional digital rupturing of the cyst gives at least temporary relief. The swelling is due to a pathologic condition of the corpus luteum which we are learning to better understand. "It is evident that if we have such a patient with alternating periodic ovarian swellings and see her for the first time and break her cyst under our fingers, we cannot tell what we have broken. But when we are better acquainted with the abnormal periodicity of her ovaries, we can even go so far as to rupture her cyst intentionally and with beneficial results." An irregularity of the corpus luteum may cause a diagnosis of extra-uterine pregnancy, and later symptoms of these alternating ovarian swellings may appear.

An Analysis of Ectopic Gestation. Lilian K. P. Farrar, New York City. *American Journal of Obstetrics,* June, 1919.

The author gives full and detailed statistics of 309 cases of ectopic pregnancy, from which she presents the following conclusions:

1. Infection or mechanical alteration due to adhesions of the Fallopian tube predisposes to ectopic gestation.

2. The onset of symptoms, or an acute attack occurs equally as often at the time of an expected period, as it does when a period is overdue.

3. Pain with or without bleeding is present in every case of ectopic gestation unless unruptured.

4. Tearing, lancinating pain is not as common in ectopic gestation, as pain of a cramp-like or bearing-down character.

5. Unusual, one-sided pelvic pain when associated with evidences of peritoneal irritation and fainting, warrant the diagnosis of ectopic gestation.

6. The treatment should be operative in every case as soon as suitable hospital arrangements can be made.

7. The end-results justify leaving the other tube in the abdomen, at the time of operation, unless positively diseased.

The Menopause, An Analysis of Two Hundred Cases. C. C. Norris, Philadelphia. *American Journal of Obstetrics,* June, 1919.

Norris presents an interesting series of two hundred cases of menopause, with careful observation of its attending phenomena. He presents four types:

(a) Sudden or almost immediate cessation of flow, the entire period lasting two or three months.

(b) Gradual but slow cessation of menstruation.

(c) Marked irregularities, but becoming progessively less.

(d) Prolonged irregularities lasting over a period of eighteen months.

He emphasizes the fact that the menopause is a period in which pathological lesions are extremely likely to make their appearance, and that it is desirable that all women should at this time be under the observation of a physician. He presents the following conclusions as a result of the study of this period.

1. The menopause is due to a change in the ovary. This is borne out by chemical facts, histological studies and animal experimentation.

(2) The usual age in the Eastern United States is forty-six to forty-nine.

3. The following conditions prolong the menstrual functions: child bearing, marital relations, good nutrition and hygiene, city life and education; while converse conditions lead to an earlier menopause.

4. Climate and race influence the age at which it occurs, as well as hereditary influence.

5. In the majority of cases, the chief feature is not the diminution of bleeding but the neuroses. These frequently antedate any change in the menstruation and may continue for six to eight months after the cessation of bleeding.

6. Normally the menopause is established without an increased loss of blood. Menorrhagia should always be viewed with suspicion.

7. In 90 per cent of healthy women, the menopause occurs normally but in 30 per cent of these there are symptoms which call for a careful gynecological examination.

8. All women at the menopause should be under the care of a physician. The menopause will thus be established with less discomfort, and many malignant neoplasms will receive earlier diagnosis.

Tuberculosis of the Cervix Uteri, with Report of a Case. G. A. Moore, Brockton, Mass. *Surgery, Gynecology and Obstetrics,* July, 1919.

Brockton reviews the literature of the subject. The disease is very rare. It is more commonly secondary than primary. The portals of infection are via the blood stream, by direct extension from tuberculosis of tubes or ovaries, and possibly by direct infection at coitus or through other external agencies as gloves, unclean hands, etc. There are four common varieties, military, interstitial, vegetating, and ulcerating. Two rare varieties are the catarrhal and inflammatory form. The diagnosis is clinically difficult, all types and stages of the disease resembling carcinoma. It usually occurs before middle life. The discharge is at first mucoid, later streaked with pus or blood. Pain is slight. The cervix is enlarged and patulous, soft and velvety, bleeding slightly on examination. Infiltration and induration of surrounding tissues is slight. Treatment depends on the presence of lesions elsewhere in the body. When child-bearing is not an issue, pan-hysterectomy should be performed.

In the author's case, a diagnostic section showed tuberculosis, and vaginal hysterectomy was performed.

Malignant Leiomyomata. Mina Shepard Proper and Burton T. Simpson, Buffalo, N. Y. *Surgery, Gynecology and Obstetrics,* July, 1919.

The authors emphasize the frequency of this condition, and the fact that the condition nearly always occurs in cases when there have been previously existing fibroids. They believe that in view of the frequency of malignant change in fibroids, surgical intervention is indicated in all cases. *X*-ray treatment of fibroids in women past 40 is dangerous as indicated by Geist, because if malignant change has taken place valuable time is lost. There are three testalogical types of malignant leiomyomata: (1) those whose cells resemble closely the benign form, (2) those whose cells are short, plump, spindle-shaped, with oval nuclei. (3) those bearing a great variety in the morphology of the cell. The testalogical type seem to correspond with the clinical type.

Vaginal Hernia. Horatio B. Sweets, Minneapolis. *Annals of Surgery,* June, 1919.

Sweets reports a case of vaginal hernia, an unusually rare condition. The patient, aged twenty-one, complained of a swelling, protruding from the vaginal posterior wall. Examination showed a swelling caused by the protrusion of the posterior vaginal wall, through the vagina, The swelling was about the size of a lemon, and resembled exactly a rectocele. The perineum was intact. Operation showed a sac containing fluid but no intestine, between the rectum and vagina. The condition was probably caused by a previous laparotomy during which the flow of the cul-de-sac was injured. Later a sac of peritoneum must have gradually been forced into the tear.

Epigastric Hernia in the Soldier. J. N. Hall, Denver. *Journal of the American Medical Association,* July 19, 1919.

The importance of epigastric hernia is not generally realized, Hall thinks, although there is no lack of description of the condition in the text books. These hernias generally occur in or near the central line, 2 or 3 inches up from the navel. An ordinary lipoma may occur here, but is more movable and not tender on pressure. Keen describes four varieties of this hernia: "1. A small mass of subperitoneal fat without any sac. 2. In addition to the subperitoneal fat a process of parietal peritoneum attached to it without any contents. 3. A sac containing omentum (omentocele). 4. A sac containing intestine." If the opening of the sac is large enough the contents may increase in coughing, but this happens in less than 10 per cent. of all cases. Of the many score that Hall has seen, only half a dozen contained any portion of the bowel. The fault in the statistics is due to the failure to recognize the very small hernias, as large, say, as a shirt button. There are twenty of these to one the size of a filbert. In 80 per cent., it may be, there are no symptoms, but if a bit of omentum actually comes through the orifice, symptoms are produced of pain or discomfort, a feeling of dragging, and the ulcer symptom, sour stomach, occasional nausea and even vomiting; distress after eating with periodic exacerbation of all symptoms, and even colic. Sharp pressure causes the patient to double up to escape pain, and in two or three cases Hall has noticed that an instant belching follows a touch on the hernia. The association with gastric ulcer has long been known, but is not as often recognized as it should be. No benefit would be received from operation for ulcer if the hernia were overlooked. Hall reports cases illustrating the condition, and believes that physicians should examine with special care for these hernias in every case of digestive disease. If one is found, the surgeon should be consulted as to the advisability of operation. The question arises only in a minority of cases, however. The operation is trivial in comparison with the results commonly obtained.

Five Cases of Strangulated Hernia, Complicated by Acute Appendicitis. L. H. KORUDER, Davenport, Iowa. *Journal of the Iowa State Medical Society,* July, 1919.

Koruder presents these cases as a forcible argument against taxis in strangulated hernia. In any of his cases taxis could only have resulted in a ruptured appendix, or general peritonitis. The author believes that the congestion due to strangulation is the cause of the appendicitis, rather than that the acute appendicitis caused the strangulation.

The Carrel-Dakin Treatment in Empyema at Camp Custer, Michigan. JOHN M. HENDERSON, Seattle. *Northwest Medicine,* June, 1919.

The Carrel-Dakin treatment of wounds may be employed successfully in empyema. The best results are obtained in acute cases where costectomy was performed and a limiting membrane had formed, and an opening made sufficiently large to introduce four to eight Carrel tubes. The average acute cases can be sterilized in from six to ten days and the wound successfully closed by sutures or allowed to close spontaneously; from the beginning there is a complete absence of odor, the pus disappearing very rapidly and the patient's general condition showing marked improvement. The treatment of delayed cases consists in opening the pockets when possible, or enlarging the sinus sufficiently to introduce tubes, followed by complete or partial sterilization of the cavity or old sinus with Dakin's solution, and finally the introduction of Beck's paste.

The treatment of the cases of large pneumothoraces consisted in sterilization of the cavities with Dakin's solution, and the subsequent sealing of the wounds.

The Surgical Treatment and Prognosis of Empyema Following La Grippe. L. LEYVA and DR. LEGENDRE. *Surgery, Gynecology and Obstetrics,* July, 1919.

From a study of 27 cases of empyema following influenza, of which eight were fatal, the authors present the following conclusions, as regards prognosis and treatment. The prognosis in empyema is not based upon the nature of the organism causing the condition, but is based principally upon the condition of the lungs. In the early cases it is best to begin by aspiration and injection of therapeutic sera until the pulmonary symptoms have subsided. The micro-organism causing the effusion has no bearing on the type of operation to be performed. In pleurisy developing late in la grippe, the pleurotomy opening must be large, extending backward; resection of a rib is a necessity. The classic treatment consisting in drainage without irrigation is the method of choice.

Empyema in Children, with Special Reference to Diagnosis. FRANK SPOONER CHURCHILL, Boston. *Boston Medical and Surgical Journal,* July 24, 1919.

The author presents the following summary of his studies of empyema in 5 per cent of 824 cases of lobar pneumonia, and 1½ per cent of cases of broncho-pneumonia, in the Children's Memorial Hospital.

Empyema in children is relatively infrequent, developing in only about 5 per cent of cases of lobar pneumonia.

It is gradual in onset. In all cases of pneumonia, the possibility of its development should be borne in mind and the primary, original disease carefully studied.

Its early diagnosis with fluid small in amount is often difficult; late diagnosis with fluid considerable in amount is easy.

The diagnosis in infants and children is more difficult than in adults.

Exact examination of the chest, performed daily, is often necessary to detect the condition.

A displaced apex-beat is an important diagnostic sign.

In all cases of pneumonia where fluid in the pleural cavity is suspected, the exploring needle should be used, and if necessary, repeatedly.

A Study of Bladder Function. ARTHUR H. CURTIS, Chicago. *Surgery, Gynecology and Obstetrics,* July, 1919.

Curtis paralyzed the bladders of twenty-two rabbits by cutting the spinal cords. Post-operative results were as follows. Vesical detention occurred in every case. In fifteen cases the ureters were markedly distended. Fifteen cases developed nephritis with hemorrhages. In twelve, infection was present. These experiments indicate that the unrelieved paralyzed bladder offers a two-fold menace to health: first through frequent infection of the urinary tract due to contamination of static urine; second through back pressure which distends the ureters, seriously interferes with kidney function and damages kidney tissue. The author believes that in humans, after operations and in other conditions when the bladder fails to empty itself spontaneously, catheterization should be performed regularly and often enough to prevent vesical distention.

Some Phases of Operative Cystoscopy. BRANSFORD LEWIS, St. Louis. *International Journal of Surgery,* May, 1919.

Lewis reports two cases of cure of carcinoma of the bladder by application of fulguration and radium. The radium is introduced into the bladder by means of a capsule enclosed in a black rubber cover, and attached to a catheter. Lewis has also had favorable results with the use of the electro-incisor, in cases of contracture at the vesical neck. This is done by burning a deep groove through the ring at the neck of the bladder, under direct observation through the cystoscope. Ureteral stones 4 cm. above the ureteral orifice can be removed by the ureteral forceps, provided the ureter below is well dilated first by means of the ureteral dilator. Three such cases are reported. Lewis also reports a new method for differentiating phlebolith from ureteral stone. In a case in which an x-ray picture, taken with a ureteral catheter in place, showed a shadow directly in contact with that of the flexible catheter. Another picture taken with a ureteral forceps instead of the catheter, showed the shadow to be outside of the ureter.

Suprapubic Prostatectomy as a Logical Proposition. GUSTAVE KOLISCHER, Chicago. *Urologic and Cutaneous Review,* August, 1919.

Kolischer insists that there is no reason why suprapubic enucleation of the prostate should be performed in the dark and only by the sense of touch. He presents the valuable information that the prostate can be easily exposed in every case if retractors are placed in the upper and lower angles of the bladder opening, and the pull exerted in the occipito-caudal direction. Transverse retraction hides the prostatic portion of the bladder instead of exposing it. With the bladder exposed in this fashion, the trigonal mucosa can be incised with the knife and the capsule of the prostate clearly exposed. In this manner the operation of supra-pubic prostatectomy can be performed according to correct surgical principles, good exposure being one of the fundamental necessities.

The Results of Prostatectomy at the Present Time, with Brief Report of One Hundred Consecutive Cases, with One Death. Andrew J. Crowell and Raymond Thompson, Charlotte, N. C. *Urologic and Cutaneous Review,* August 1919.

The authors report 100 cases of perineal prostatectomy with only one death. The average age was 62 years. In 39 cases followed up by a series of questions and replies, the following reports were received. All had healed wounds. Average time for the healing of the wounds was 40 days. Water was passed usually five times during the day, twice at night. Control was perfect in 36 of the 39 cases. Cystitis was present in 3. Three reported pain on urination. In 13 cases, sexual power was unimpaired. Urine was clear in 33 cases. One case had a vesical calculus. All reported improvement in general health.

The authors believe that the excellent results obtained are largely due to pre-operative and post-operative care. The operation is a safe one and should always be performed when the kidney functional activity is good (phenolsulphonephthalein excretion above 40), the circulation normal, and the lungs in good condition.

Anesthetic Problems in Prostatectomy. Lillian B. Mueller, Indianapolis. *Urologic and Cutaneous Review,* July, 1919.

The main factors complicating anesthesia in cases of removal of the prostate are the age of the patient, his lowered vitality or resistance, and the toxemia due to chronic retention of urine. Local anesthesia is difficult and tedious, and not devoid of pain incidental to the removal of the glands. Spinal anesthia is often dangerous and may cause extreme depression. Chloroform is not to be considered because of the fact that it causes fatty degeneration of liver, kidney and other organs, and is a powerful heart-depressant. Ether is undesirable in old men, because of the irritant effect on kidneys that are already impaired and because of the danger of pulmonary complications. The anesthetic of choice is nitrous oxide-oxygen. It is harmless and non-toxic. It does not irritate the lungs or kidneys.

To sum up: The anesthetic in a prostatectomy is an important factor in the outcome of the operation. It is difficult on account of, first, the age of the patient; second, his lowered vitality or resistance; third, the toxemia from which he suffers. Local anesthesia, chloroform and ether are all open to objections. Nitrous-oxide combined with oxygen is the most pleasant, safest and least toxic of all anesthetic agents, and gives satisfactory results in prostatectomy. Its administration should be preceded by a preliminary hypodermic injection of 1/6 to ¼ grain of morphine.

Papillary Tumors of the Pelvis of the Kidney. E. S. Judd. *Journal-Lancet,* May 15, 1919.

Nephrectomy is the indicated treatment if the opposite kidney is in good condition. Conservative treatment of such tumors is predisposing to recurrences elsewhere. The tumors are liable to undergo an immediate change into malignant growths. It is advisable always to remove the ureter with the kidney. Broken-off pieces of tumor are most apt to lodge at the uretero-vesical junction.

Roentgenographic Diagnosis in Renal Tuberculosis. W. F. Brasch and F. A. Olson, Rochester, Minn. *Surgery, Gynecology and Obstetrics,* June, 1919.

Brasch and Olson report that in a series of 131 patients operated upon at the Mayo Clinic for tuberculosis of the kidneys, about 20 per cent. showed suggestive shadows. The shadows are due to deposits of calcium and assume various forms. The shadow may be differentiated from that of a stone by the variability in its density, a lesser density than that of stone, and by irregularity in its outline. The shadows are either multiple small scattered areas, single or few localized areas of one centimeter or more, or large irregular diffuse areas involving a large portion of, or the entire kidney. The authors believe that positive evidence of tuberculosis of the kidney may be obtained by the method, when all others fail. Occasionally caseated areas in the ureter and prostate may also be outlined.

Submucous or Physiological Implantation of Ureter into the Large Intestine. Robert C. Coffey, Portland, Oregon. *Urologic and Cutaneous Review.* August, 1919.

After careful experimental work on dogs and operations on humans, Coffey lays down the fundamental principles of operation, in implantation of ureters, after removal of the bladder. These are first, the implantation of the ureter into the large intestine. Secondly, the ureter must be made to run under the loose mucous membrane for a distance before entering the lumen of the large intestine. He believes that most failure and secondary infections have been due to a violation of this latter principle. The Mayos have had success in a large number of cases because the operations were in accordance with these principles.

The following essential points of the operation should be carefully studied.

1. The ureters should empty into the bowels in the direction of its long axis and from above downward, so that the urine is discharged in the direction taken by fecal matter.

2. The ureters are buried in the wall of the rectum for a distance of an inch or so longitudinally, so that in the act of defecation, the fecal mass will close the ureters by its pressure on the mucous membrane, and that pressure is exerted from above downward, in the direction of the onward flow of urine, thereby emptying the ureters by a milking process.

3. The ureters are further protected by the mscular coat of the intestine. This is accomplished by surrounding them in their longitudinal course through the intestine, to the extent of 2 cm. by the circular coat of the bowel. This muscular coat of the bowel, in acting from above downward, milks the urine downward and holds the ureters closed when the rectum is aiding in defecation. When the contraction and closure due to defecation is over, the urine will spurt with considerable force, acting as its own cleanser.

4. The ureters are implanted in the lower bowel which is normally empty, except at defecation.

Cancer Therapy. Rollin H. Stevens, Detroit. *The Urologic and Cutaneous Review,* July, 1919.

Stevens believes that in view of the fact that the effect of *x*-rays and radium on cancer cells has been so definitely proven, pre-operative treatment of cancer is justified. He usually gives two or three *x*-ray treatment series before operation, and in suitable cases (uterine or rectal), combined *x*-ray and radium therapy.

The reason for giving so much ante-operative treatment is:

First—To limit the cancerous growth as much as possible before it is cut into, reducing it in size and loosening up its attachments to skin and muscle as much as possible.

Second—To destroy cancer cells in neighboring lymphatic systems, the latter in every direction from the original growths.

Third—To contract and seal up as much as possible small lymphatic and capillary circulation, thus giving further protection against metastases.

The operation should not take place earlier than two weeks after the last series of *x*-ray or radium treatments, because:

First—It allows time for regeneration of white blood cells, particularly the lymphocytes, which seem to be related to some immunity process. This regeneration of lymphocytes requires about two weeks' time.

Second—The shock of the operation is a sufficient tax on the protective mechanism of the body without adding to it absorbed toxines from broken down leucocytes following *x*-ray or radium treatment.

Third—There is usually a congestion, and at times edema, of the tissues for a few days after deep therapy. This means more oozing of blood and a wound more susceptible to infection.

Fourth—After long continued x-ray treatment the tissues treated are more or less contracted, the capillary oozing is diminished and the tissues are in a better condition for healing.

Fifth—Metastatic growths in neighboring lymphatic glands are often eliminated and the operation need not be so extensive.

Acute Thyroiditis. George E. Beilby, Albany, *New York State Journal of Medicine*, July, 1919.

The author presents three cases of acute suppuration of the thyroid gland; in one case cystic degeneration was present. The source of infection may be either by direct lymphatic extension from the larynx and trachea, or hematogenous. The symptoms are chills, fever, malaise, lancinating pain usually on one side of the neck, radiating upward. Local swelling occurs late in the disease and is never marked. Dyspnoea and dysphagia may be present. The diagnosis is difficult, mainly because of the absence of local signs of inflammation. A pathognomonic symptom is the stony hardness of the gland. Operation should be performed under local anesthesia. Free drainage should be established. The following facts should be emphasized:

1. The relative infrequency of acute thyroiditis in either the normal gland or in pre-existing pathological conditions.
2. The condition, particularly in the early stage, is apt to be unrecognized.
3. The diagnosis can be made more readily if the possibility of acute thyroiditis is borne in mind and confirmed by the stone-like hardness of the gland.
4. Treatment by simple incision and puncture under local anesthesia, avoiding all possible injury to the gland tissue, will give the best results.

Some of the Old Hospitals of London, with Special Reference to the Treatment of Fistula in Ano with Hemorrhoids. W. J. Mayo, Rochester, Minn. *Minnesota Medicine*, June, 1919.

In a very interesting article, Mayo brings out some very practical points in the treatment of fistula in ano and hemorrhoids. He refers to important observations regarding fistula made by Goodsall. If a line were drawn transversely through the middle of the anus, all the fistulas lying anterior to this line would pass directly from the external skin opening to the internal opening inside the anal canal. All fistulas posterior to that line would have their internal opening in the mid-line of the anal canal, no matter where or how many lateral openings (the so-called horse-shoe fistulas) are found. An anterior horse-shoe fistula is practically unknown. The cause of the curved or angular shape of the posterior fistulas, the external openings of which lie laterally and lead by a crooked passage to the internal opening posteriorly, is the arrangement of the coccygeal ligaments and muscle, which protect the external tissues lying in the mid-line posteriorly, and direct the pus laterally; the so-called horse-shoe tracts and openings are thus formed.

The cure of anterior fistula is simple. A grooved director is passed from the external to the internal opening. The tissues, including the muscle are split, through the fistulous tract, thoroughly curetted, and packed so that the opening will be compelled to heal from the bottom.

The treatment of posterior fistula is more troublesome. The tracts should be carefully followed to the internal opening, split open, and joined at the internal opening. The external sphincter should be cut at only one point. The mucous membrane of the rectum should not be split over pockets lying above the internal opening. These pockets should be gently curetted and packed.

In the clamp and cautery treatment of hemorrhoids, the pile should never be trimmed away with the scissors, because if the eschar pulls apart the cut artery will bleed. The pile should be slowly converted into an aseptic eschar. There should be a half-inch of mucous membrane between groups of vessels destroyed so as to prevent stricture. External hemorrhoids and tabs should be cut away and sutured. The tube and pack—the so-called "whistle"—is unnecessary. It has been used on account of fear of hemorrhage.

Latent Infection of Healed Wounds. Sir Kenneth Goodby, England. *The Lancet*, May 24, 1919.

From a study of the bacteriology of healed wounds, especially in those cases where there has been sudden reinfection after secondary operations, Goodby presents the following conclusions:

1. Healed gas infection is an extremely common occurrence and a serious factor in the promotion of latent sepsis.
2. Anærobic infection, though persistent in a large proportion of wounds, does not commonly give rise to secondary gas infection, subsequent to operation.
3. The chief cause of temperature reaction, breaking down of wounds at subsequent operation on both healed wounds and sinus cases, may be attributable to certain types of streptococci of facultative anærobe habit, which have been demonstrated as lying present in wounds for very long periods.
4. The use of immunization to the streptococcus previous to operating on healed and semi-healed wounds, greatly diminishes the risk of subsequent breaking down of tissues operated upon.

Blood Transfusion by the Citrate Method. Alexander Fleming and A. B. Porteans, B.E.F., France. *The Lancet*, June 7, 1919.

The authors present a series of 100 cases transfused by the citrate method. In only one case were there any untoward symptoms. In this instance the blood was probably introduced too rapidly. In many cases death was prevented. The citrate method has the following advantages over other methods: (a) It is never necessary to cut down on the vein of the donor. (b) It is only rarely necessary to cut down on the vein of the recipient. (c) The donor need not be in the same place as the recipient. (d) The apparatus needed can readily be improvised.

The results are as good as those obtained by any other method. The transfusion can be readily repeated as often as necessary. The coagulation time of the blood is unaltered.

The Treatment of Burns. A. M. Fauntleroy and A. W. Hoagland. *Annals of Surgery*, June, 1919.

The authors observed thirty-two cases of extensive and multiple burns, following a ship explosion. The victims were practically enveloped in flame. They emphasize numerous important points in the management of such cases, such as the need for quick institution of immediate general supportive measures, the value of fluids in large amounts by mouth and rectum, and later, during the absorption period, the use of small doses of morphine. They noted that in addition to the initial severe shock during the first twelve hours, there is a later equally fatal period on about the fourth or fifth day. In the latter weeks exhaustion is marked.

Local procedures were initial antiseptic cleansing, with alcohol, boric acid solution, salt solution or Dakin's solution. As soon as possible protective dressings like paraffin, gutta percha rubber strips, and ointments are used. No one method served in every case. Some responded to bland paraffin dressings, others to ointments spread on lint.

Book Reviews

The Blind: Their Condition and the Work Being Done for Them in the United States. By Harry Best, Ph.D., Author of "The Deaf: Their Position in Society and the Provision for Their Education in the United States." New York: The Macmillan Company, 1919.

Among specific problems, none is attracting more attention at the present time than the care and management of the blind. The author has presented a comprehensive volume dealing not only with general conditions of the blind, and the problems of prevention of blindness, but likewise at length with the provisions for the education of blind children and for the intellectual improvement of the adult blind. The material care afforded to those lacking vision is carefully considered, and supplemented by a discussion of the organizations interested in promoting their material welfare. As a whole, it is an excellent compilation of facts, covering the history of work for the blind and brought up-to-date in that it covers the provisions made by the Government for the care and training of those whose vision has been destroyed during the war. From the standpoint of the student, the bibliographic footnotes are exceedingly helpful, and the worth of each chapter is heightened by the extensive bibliography at its conclusion.

No one interested in the general subject can afford to be without this encyclopedic discussion of blindness in its various phases as represented in the American literature. The work is based upon the experience of the United States, and, as such, may be regarded as the most comprehensive and useful volume on the subject thus far produced.

The Operative Treatment of Chronic Intestinal Stasis. By Sir W. Arbuthnot Lane, Bart., C. B., Consulting Surgeon to Guy's Hospital, and to the Hospital for Sick Children, Great Ormond Street. *Fourth Edition.* Small octavo; 328 pages; 133 illustrations. London: Henry Frowde, Hodder and Stoughton, 1918.

In this revised and somewhat enlarged edition Lane repeats his well-known views on "ideal stasis" as a cause of a wide variety of diseases—toxic, microbic and neoplastic, and its treatment by colectomy. This occupies but a part of the work, however. The remainder consists of contributions by other authors (Jordan, Adams, Mutch, Keith, etc.) on the roentgenologic, bacterial, anatomical, medical and other aspects of the subject.

Cheerio! The Story of an American Medical Officer at the Fighting Front with the British Army. By Harold, M. Hays, Major, Medical Corps, U. S. A. Doudecimo; 291 pages. New York: Adolph A. Knopf, 1919.

In this book Dr. Hays, of New York, has given us an entertaining and well-written narrative of experiences.

Surgical Clinics of Chicago. April, 1919. *Volume 3. Number 2.* Octavo; 479 pages; 63 illustrations. Philadelphia and London: W. B. Saunders Company, 1919.

The volume contains the reports of 17 clinics held by various men of Chicago. Deserving of special mention are Wyllys Andrews, Brophy, Bevins, Moorehead and Gatewood. The articles are written in their usual excellent fashion and are amply illustrated.

Books Received

The Peritoneum. By Arthur E. Hertzler, M.D., F.A.C.S., Surgeon to the Halstead Hospital, Halstead, Kansas; Associate Professor of Surgery, University of Kansas; Formerly Professor of Pathology, Experimental Surgery and Gynecology, University Medical College, Kansas City, Mo. In two octavo volumes, 870 pages, 230 illustrations. *Volume I, Structure and Function in Relation to the Principles of Abdominal Surgery.* (A Contribution from the Laboratory of the Halstead Hospital, and from the Department of Anatomy of the University of Illinois.) *Volume II, Diseases and Their Treatment.* St. Louis: C. V. Mosby Co., 1919.

The Anatomy of the Peripheral Nerves. A. Melville Paterson, M.D., F.R.C.S., Lieut.-Colonel R.A.M.C., Assistant Inspector of Special Military Surgical Hospitals, Professor of Anatomy in the University of Liverpool, Examiner in Anatomy at the Royal College of Surgeons of England, etc. Small octavo; 165 pages; illustrated. London: Henry Frowde, Hodder & Stoughton, 1919.

Symptoms of Visceral Disease. A study of the Vegetative Nervous System in its Relationship to Clinical Medicine. By Francis Marion Pottenger, A.M., M.D., LL.D., F.A.C.P., Medical Director, Pottenger Sanatorium for Diseases of the Lungs and Throat, Monrovia, California; Professor of Diseases of the Chest, College of Physicians and Surgeons, University of Southern California. Small octavo, 328 pages, 86 illustrations and 9 color plates. St. Louis: C. V. Mosby Co., 1919.

Electricity in Medicine. A Practical Exposition of the Methods and Use of Electricity in the Treatment of Disease, Comprising Electrophysics, Apparatus, Electrophysiology and Electropathology, Electrodiagnosis and Electroprognosis, General Electrotherapeutics and Special Electrotherapeutics. By George W. Jacoby, M. D., Former President of the New York Neurological Society and of the American Neurolgical Association; Consulting Neurologist to the Lenox Hill Hospital, New York, and J. Ralph Jacoby, A.B., M.D., Fellow of the New York Academy of Medicine, Member of the American Medical and the American Medico-Psychological Associations; Chief of Clinic, Neurological Department, Lenox Hill Hospital. Octavo; 583 pages; 262 illustrations. Philadelphia: P. Blakiston's Son & Co., 1919.

Geriatrics. A Treatise on Senile Conditions, Diseases of Advanced Life and Care of the Aged. By Malford W. Thewlis, M.D., Associate Editor, Medical Review of Reviews, New York City. With Introductions by A. Jacobi, M.D., LL.D., and I. L. Nascher, M.D. Small octavo, 250 pages, illustrated. St. Louis: C. V. Mosby Co., 1919.

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United States Naval Medical Bulletin. *Report on Medical and Surgical Development of the War.* By William Seaman Bainbridge, Lieut. Commander, Medical Corps, U. S. Naval Reserve Force. Washington: Bureau of Medicine and Surgery, Navy Department, 1919.

Le Français Enseigné Par la Méthode Intuitive et Direct. (*French taught by the intuitive and direct method*), par P. Dessagnes, Agrègé de l'Université; Professeur au Lycée Louis-le-Grand. Duodecimo; 304 pages. Paris: Masson et Cie, 1919.

Squibb's Materia Medica. 1919 *Edition.* A complete Alphabetical List of the Squibb Products, including all the articles of the United States Pharmacopœia (IXth Revision) and of the National Formulary (IVth, 1916, edition), together with the Non-official Chemicals, Pharmaceuticals and Newer Remedies in general use; setting forth their Origin, Latin and English Titles, Synonyms, Physical and Chemical Characteristics, Incompatibilities, Antidotes, Therapeutic Indications, Doses, etc. Also a Comprehensive Descriptive List of Tablets for Internal and for Hypodermic Use; of Biological Products, and of Reagents, including Test Solutions, Volumetric Solutions and Indicators. New York: E. R. Squibb and Sons.

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CANCER OF THE STOMACH.

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Barely half a century ago one would have been astonished to see a surgeon select a subject for a lecture, cancer of the stomach. It would appear that with a disease so frequent (cancer of the stomach represents 35% of all cancers) we were completely helpless and that our therapeutic measures amounted to simple medical palliatives.

It was in 1879, exactly 40 years ago, that a cancer was first removed from the stomach. The operation was performed in Paris, by Péan, on April 19th, 1879. The following year, a Polish surgeon, Rydygier, at Léopol, followed his example. In 1881, Billroth of Vienna, commenced a series of operations which made such operations a routine course of treatment for cancer of the stomach.

Since this time, interventions have multiplied in every country. The technical details of the operation have been precisely laid down and the immediate results considerably improved. Relapses unfortunately, are frequent. The study of the mode of extension of gastric ulcer made in Paris by Cunéo, whose work was confirmed by the School of Mikulicz especially by Bormann, as well as those by MacCarthy and Blackford, and in the clinics of the Mayo brothers, showing its usual method of propagation, has allowed for more complete extirpation and more definite cures, the number of which has been and will be increased, as physicians are better able to diagnose cases, and urge their patients to submit to an operation at an earlier period.

It may be said to-day, that cancer of the stomach is a favorable cancer from the standpoint of operation, and that if the medical attendant desires it, results of its removal will be among the best cancer results from the point of view of definite cure. The unfortunate part is that many practitioners are far from being convinced of the efficacy of the operative treatment, they appear to think that surgery should be considered only to relieve patients when medical means have been proven unable to give the slightest relief of any painful symptoms. As a matter of fact, if we wish to obtain by operative treatment, that which it can give us, intervention must be undertaken as early as possible,—that is to say, not only must the radical treatment be undertaken as soon as the diagnosis has been made, but, again, this diagnosis must be as early as possible; such are the conditions of success.

DIAGNOSIS OF CANCER OF THE STOMACH.

The diagnosis is sometimes easy, and we ought to immediately suspect the existence of a cancer when we find ourselves in the presence of an individual between 45 and 50 years of age who, without any cause, complains of a serious dyspepsia,—especially when we find it is accompanied by loss of flesh, which has not been accompanied by previous gastric trouble. If, however, we thought of cancer only in such cases, we should overlook a great number of neoplasms, for Hayem often has showed us (confirmed by numerous observations) that cancer of the stomach succeeds an ulcer, and that patients with neoplasms come under medical observation after long gastric trouble.

BY WHAT SIGNS CAN WE RECOGNIZE THE BEGINNING OF THE CANCER DEGENERATION?

It is very often difficult to be precise about this matter. More or less complete loss of appetite, disgust for meats and fats often suggest it. If at the same time patients lose weight and strength,—become pale more rapidly than we would expect under diminished digestion, the probabilities of cancer degeneration are increased. These probabilities increase still further if there is vomiting of food imperfectly digested, especially if the vomitus has somewhat the appearance of coffee grounds and the color of *civet de liévre* (hare cooked with red wine, a favorite French dish.)

The laboratory examination will often aid us in diagnosis. The diminution of acid especially of free hydrochloric acid, the presence of acid fermentation (lactic acid and butyric acid), the demonstration by chemical analysis of occult blood should be looked for. We must not always consider the laboratory examination absolute; for relying entirely on these examinations would be to expose ourselves to diagnostic errors. I have seen on many occasions in cancerous ulcers, not only persistence but increase of hydrochloric acid; on the other hand, I have found the presence of lactic and butyric acids in ulcerous stenosis, entirely independent of any cancerous formation and due simply to fermentation following stasis of fluid stomach contents. We must therefore consider these various chemical examinations as simply of relative importance, not absolute; only having value when corroborated by other symptoms.

Practically, from the surgical standpoint, the diagnosis of cancer of the stomach is fairly easy. It is true that cancers on the left side, apart from those of the cardia, have a special symptomatology, and are somewhat difficult to diagnose for they manifest themselves by few symptoms at the beginning, at which time only a radical operation is possible. Fortunately, they are rare in comparison with those of the pyloric portion and the ulcer growths of the stomach, which comprehend about 80% of all gastric cancers.

These cancers attract more attention because in many cases they manifest themselves by a number of symptoms that one finds when there is an obstruction to the normal evacuation of the gastric contents, whatever may be the cause of this obstacle.

This symptom-complex which we described 20 years ago in collaboration with Soupault, under the name of "pyloric syndrome" consists of the appearance of pains two hours or more after meals, which cease completely after vomiting. Every time we have such cases, we find it necessary to make a methodical examination of the stomach. One of the most important points for a surgeon to know is whether a gastric stasis exists. Certainly we find stomachs that are atonic, sagging and *clapotant* (splash test) in women especially, but those stomachs empty themselves slowly and finally, after 14 hours without food, become completely empty. The recognition of alimentary stasis in the morning before meals, genuine alimentary retention, incomplete, may be compared to incomplete urinary retention and like it, has some connection with an obstacle preventing normal evacuation of the reservoir. This stasis suffices to prove to us that the patient cannot be cured by medicinal treatment. The surgeon should never neglect to look for it, in every gastric affection where there is a question of an operation.

For the test, add to the food usually taken by the patient in the evening some carrots. Carrots are not hard and indigestible like raisins or the skin of prunes and they are easily recognizable in the stomach contents. The patient remains fasting during the night, and should not even take anything to drink. The next morning, we empty the stomach with a tube. In the fluid contents extracted, it is easy to recognize the debris of carrots. The stomach is then washed and completely emptied. We then inject air through a canula with balloon attachment similar to that used for the thermo-cautery. By percussion of the abdomen, we are able to sketch with a dermographic pencil the contour of the distended stomach on the abdominal wall.

When there is a tumor, it should be sketched before insufflation. During insufflation we usually see the tumor displaced to the right and upwards. When the stomach is insufflated, and we have marked out its contour, we find it situated at the junction of the two curves. The diagnosis of a pyloric tumor is written on the surface of the abdomen.

We now oblige our patient to take a test meal of which we relieve him at the end of an hour; a chemical analysis is then made according to the usual methods. For a number of years we have never failed to make a radiographic examination of the stomach although it is evidently not necessary in many cases; it is however, very useful and it allows us to observe tumors which cannot be mapped out by palpation alone.

Our radiographic expert, M. Maingot, proceeds to do this in the following manner:

Six hours before the examination, he administers 100 grams of sulphate of barium in a flour-paste. Normally, the stomach, duodenum and the jejunum should be empty at the time the patient presents himself to the radiologist. Stomachs that are much elongated, falling almost entirely to the symphysis pubis, can contain from ¼ to 1/5 of the opaque meal without the existence of a stenosis. When it exists, a pocket persists larger or smaller above which there is usually a transparent liquid.

At the time of the examination M. Maingot administers another opaque meal of 100 grams of sulphate of barium in 300 grams of tragacanth mucilage which mixes with water only with difficulty. When there is liquid in the stomach, this mixture spreads in large detached masses which go to the bottom of the organ very much more quickly than in the case where the viscus is empty. This method of filling up is characteristic and allows one to affirm the existence of residual liquid, even when the latter cannot be distinguished on account of the absence of a pocket of air.

When there is no gastric dilatation, the 400 grams of this opaque meal suffice to fill three-quarters of the stomach. If the organ is dilated, it fills a lesser space. It is then usual to see the organ change shape and to enlarge transversely. At the same time in case of cancer, one sees lacunar images (of spaces) which must be examined from the front and from the side. Seen from the front and from the side, the radioscopic examination allows us to recognize the contractions which are not contained through the spaces (lacunæ). Here we have the means of making a differential diagnosis of importance between the spasmodic deformation which might simulate the lacunæ. The lacunar images of cancer represent the space which the opaque substances cannot enter at the level of the tumor, which projects into the cavity of the organ. Therefore, one understands that the pressure on the lacunar zone increases the latter. This is a method of exploration which can be applied in doubtful cases.

The radiograph plate allows us to retain an image of these lacunes of which the form and site vary according to the case. But from what I have already stated, the radiographic plate is far from giving the information which one obtains by fluroscopic examination, inasmuch as by the latter method, one can determine the mobility of the tumor, its sensibility to pressure and the displacement of neighboring organs.

Surgical Anatomical Pathology of Cancers of the Stomach.

It is of great importance for the surgeon to recognize the lymphatic glandular propagation and the mode of extension of cancer on the gastric walls, in order to act as we would in other regions and follow the usual rule, which is to remove in one block all the tumor tissue and the invaded glandular territory. In this connection, the work undertaken at my instigation by my pupil Cunéo, whose studies have been confirmed everywhere, is of the greatest interest, since it shows in what way we should direct our exploration once the abdomen is open, and indicates in a precise manner, rules which should be followed in the course of its extirpation.

(1) Lymphatic propagation: Apart from the region of the fundus wherefrom the lymphatics run towards the spleen of the cardia, other regions of the stomach, and particularly the pyloric region, have lymphatics which converge towards the lesser curvature (figure 1); those of the great curvature ascending behind the pylorus. The glands most frequently removed in cancers of the pylorus or the antrum are those of the lesser curvatures (91.4%) which is explained by the fact that the tributary lymphatic collectors of these lymphatic ganglia represent the principal lymphatic channels of the stomach. The subpyloric lymphatic ganglia are invaded only in 62.5% of cases. In the coronary chain of the stomach, the ganglia placed on the descending or right of the coronary branches are almost always involved; they are, as a matter of fact, the direct terminals of the lymphatics of the pylorus. These ganglia are rather far from the pylorus and in the neighborhood of the point where the trunk of the coronary borders on the stomach. The sub-pyloric ganglia are placed beneath the pylorus in the thickness of the gastro-colic ligaments; they are at some distance from the greater curvature and adhere sometimes to the tranverse mesocolon. The retro-pyloric ganglia are placed between the pylorus and the anterior surface of the pancreas, receiving the efferent vessels directly from the posterior surface of the pylorus; they are invaded early.

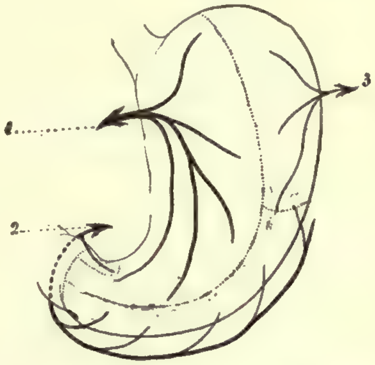

Fig. 1—Lymphatic Locations of the Stomach.

(2) Propagation within the gastric walls: The development takes place at the expense of the mucous membrane, the cancer rapidly reaches the sub-mucous membrane which may contain white rounded nodules, and which may be more considerable than in the mucous membrane, (figure 2), which indicates the necessity of incising the stomach walls several centimetres from the apparent limit of the cancer (at least 3 centimeters). The muscular and serous coats are invaded in turn, so that the surface of the stomach appears covered with pearl-like white edges, sometimes smooth,—sometimes slightly raised on the surface.

An important point for the surgeon's consideration is the mode of extension of the neoplasm in its breadth. In this connection, we must remember the frequency of the invasion of the smaller curvature, which is in relation with the general law by which epitheliomata fuse towards the lymphatic hilum of the invaded organ, (figure 3). Most of the incomplete removals are so by reason of insufficient excision of this smaller curvature; it is necessary to make the section near the cardia, above the point where the lymphatics leave the small curvature to pass into the thickness of the lesser omentum. On the contrary, the invasion is less marked on the side of the duodenum, where it rarely extends 2 centimeters; there is therefore, but little risk in making an incomplete amputation on this side.

Contra-indications to Surgical Intervention.

We know how to make the diagnosis of cancer of the pylorus. We understand its mode of extension and its lymphatic propagation; but before we decide upon an operation, we should determine whether or not there exist any contra-indications. The extreme weakness of the patient may embarrass the surgeon. If, however, this weakness is due to a state of inanition from want of sufficient alimentation depending on a very rigid stenosis of the pylorus,—one may operate in two stages. The first operation should be under local anesthesia, and consists in performing a gastro-enterostomy. In 10 or 15 days, when the patient has regained some strength, resection is made. We have by this method, obtained some successes.

The usual contra-indications come from the recognition of the general conditions, such as the presence of ascitic fluid in the abdomen, an abnormal enlargement of the liver, enlarged supraclavicular or inguinal glands, a neoplastic induration of the umbilicus, the existence of solid tumors of the ovary. In their absence, unless the patient is absolutely cachetic, it is permissible to open the abdomen and to determine by direct examination, whether the tumor can or cannot be extirpated. Unfortunately in a number of cases, we find extirpation impossible, but even here we may often establish a gastro-intestinal opening or gastro-enterostomy, which if it does not cure the patient will correct the accidents connected with gastric stasis, preventing the vomiting, diminishing pain and procuring a certain amount of comfort which will allow the unfortunate victim of cancer to pass away slowly and more comfortably as the weakness becomes progressive.

Sometimes even the improvement is such that for months, patients may think themselves cured, and hope for prolonged life. In general, the usual term of life is about six months and a half.

Technic of the Operation.

After having cut through the smaller omentum in the part which is only moderately vascular, and opened the greater omentum sufficiently near to the stomach so as not to injure the mesocolon, and to be sure, by direct exploration, of the possibility of an extirpation, the surgeon may undertake the resection. Lifting up the liver, the stomach is drawn down, the falx of the coronary is ligated and severed, drawing down the lymphatic ganglia which are found at this level. The rubber-covered clamps having been placed on the stomach as near as possible to the cardia, the surgeon cuts this viscus between the clamps, throwing it to the right, thus removing almost the whole of the smaller curvature. A thrust made with a sound into the duodeno-pancreatic furrow, bares the gastro-duodenal artery (Figure 4) which can be ligated all the more easily, because it is isolated—the vein leaves the artery to run along the lower border of the pancreas, joining the superior mesenteric vein. There remain now, to complete the resection, but to separate the pylorus from the great omentum and to divide the duodenum. It is necessary to divide the great omentum at a certain distance from the stomach, in order to remove with the tumor the sub-pyloric ganglia which unlike those of the lesser curvature are not in immediate contact with the stomach.

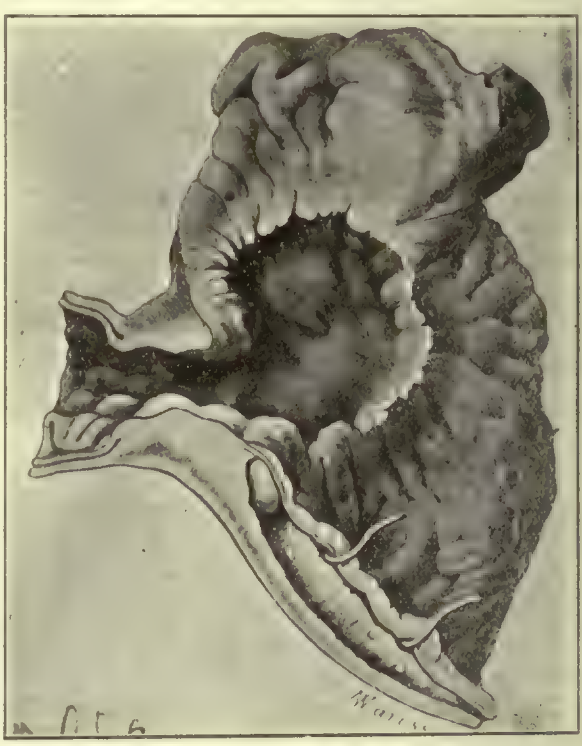

Fig. 2—Stomach opened showing on the anterior surface near the great curvature. The cancerous ulceration extends along the lesser curvature. In the cellular tissue, under the mucous membrane a cancerous mass can be seen at some distance from the ulceration.

We must remember these ganglia may adhere to the tranverse mesocolon, and that it is necessary to proceed with great care, because it is at this level that we find the great anastomotic vascular arcade of the mesocolon. With the pylorus, the retropyloric ganglia can be removed since they can be easily separated from the pancreas, and without bleeding, thanks to the preliminary ligature of the gastro-duodenal ligature. The operation is terminated by one of the gastro-intestinal anastomoses, either by a gastro-duodenal implantation or by a gastro-enterostomy.

We prefer these methods of anastomosis to the end to end operation recommended by Billroth, for in view of the difference in caliber between the duodenal section and the gastric section, the surgeon is obliged to make a Y suture.

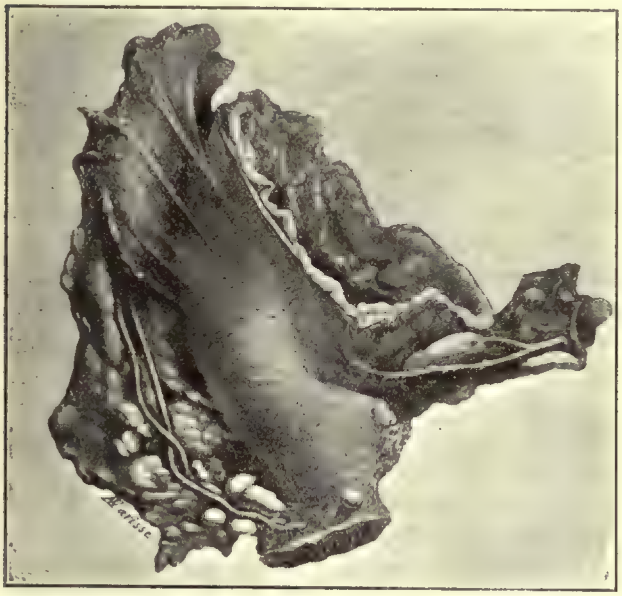

Fig. 3—Excised portion of the stomach seen from its posterior surface. Note the engorged lymphatic glands extending far from the pylorus.

The technic which I have described, appears to be that which has given the greatest number of definite cures. We should not, however, think that less complete operations have no advantage. Wm. Mayo advises excision of gastric cancers, even when the ganglionary masses cannot be removed. It is certain that the improvement obtained by such operations are much superior to results obtained from a simple gastro-enterostomy. In such cases, we can follow the technic of Temoin. He makes no preliminary ligations of vessels, relying on the fact that the arterial trunks (gastro-epiploic, coronary, pyloric) are not attached to the stomach, but send smaller vessels through it which run through the serous and muscular coats, then pass through to branch out in the cellular tissue, he therefore contents himself with drawing the stomach out of the abdomen, rubbing with a compress the anterior and posterior walls in order to isolate these vessels. These small ramifications tear without any resistance, and the slight flow of blood which results is stopped almost immediately. This maneuver repeated over the vessels of the larger and lesser curvatures allows us to detach the great vessels as far off as is necessary to do the excision. Although the operation of Temoin is an incomplete operation and leaves in place the glands, results have been fairly good. Simple gastro-enterostomy, while an excellent palliative, appears to be destined to more and more restricted application, in all cases where the stomach can be mobilized, where consequently, excision is technically possible, it being justifiable in spite of its being an incomplete operation, since it sometimes preserves life where survival was despaired of.

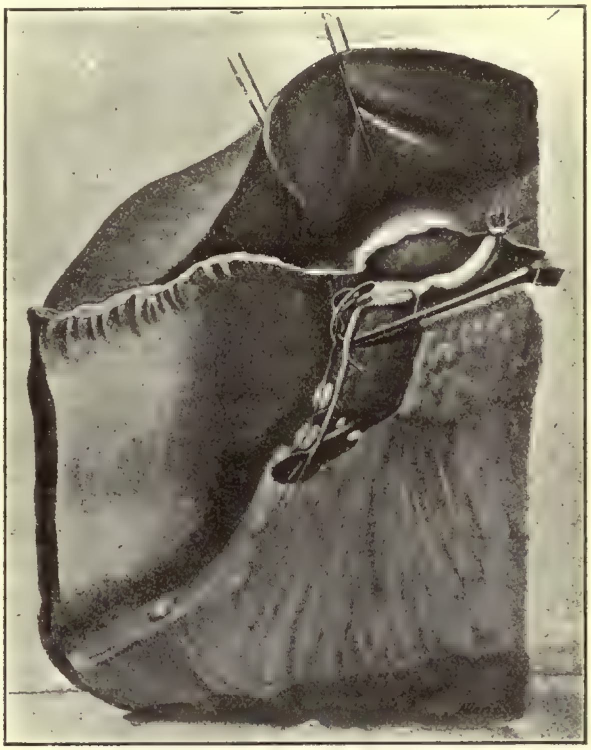

Fig. 4—The excised stomach is thrown over to the right. At the bottom of the pancreatic-duodenal furrow the gastro-duodenal artery can be seen, which can be ligated, thus allowing its removal later and the prevention of hemorrhage from the ganglia situated lower down.

ULTIMATE RESULT OF THE OPERATION.

In conclusion, I shall mention a few statistics relating to the ablation of gastric cancers. Lerichie in his thesis of 1906, had collected 88 observations of patients who had survived more than five years; in some cases even 15 years. Since then the number cured has multiplied. Although Temoin's operation leaves the lymphatic ganglia in place, 169 patients survived the operation and nineteen for five years; eight over six years; five over seven years; four over nine years; one over ten years, one over twelve and one over thirteen years.

W. Mayo with 239 operations; during five years found that 62 survived for five years; eighteen over eight years, seven for ten years, five over eleven years, two over twelve years.

I have lost sight of a great number of my own cases, but have been able to follow three living after three years; three after six years; two after seven years, and one after thirteen years.

It is therefore permissible to say that the surgical cure of cancer of the stomach is possible. The situation would be improved still further if physicians whose collaboration is so necessary, would endeavor to diagnose cancer of the stomach early and immediately reommend their patients to have recourse to surgical intervention.

THE PRACTICAL TISSUE EXAMINATION. HERESIES AND FACTS.

B. G. R. Williams, M.D.,
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Asked to roughly classify tissue examinations, I would suggest the following scheme: 1. Surgical excisions. 2. Autopsy material.

This paper is concerned with the first class of work only; and it may be ventured first of all, that the methods applicable to surgical excisions are entirely different from those used in working up postmortem material.

Those methods best applicable to surgical pathology, are the rapid methods, although in some cases where haste is not imperative, the slower methods may be used. However, they are usually unsatisfactory because both the surgeon and the patient wish to know the finding as soon as possible.

Reliability of the Freezing Methods.

Many men (and especially those interested chiefly in research or autopsy work) are inclined to the opinion that the freezing methods are less reliable than the celloidin and paraffin methods; but this idea is erroneous, providing of course proper technic is used with the freezing. The sections are somewhat thicker, but in the proving of cancer, the pathologist is quite as much interested in cell relations as in cell types, and while sections can be too thick, it is just as well for them not to be too thin. Then it is absolutely true that the man who has relied mainly upon the celloidin and paraffin methods, will attempt with the freezing methods, those same fixations and stains to which he has become accustomed. He will promptly fail to get results because the after-technic applicable to the freezing methods is entirely different from that used in autopsy work.

Quite a few authorities are now agreed that by proper fixing and staining methods, frozen sections may often be more perfect, more valuable and more beautiful than those secured by paraffin or celloidin infiltration. The reader may be somewhat surprised in the statement which is to follow and which has no particular relation to the subject: the writer of this paper has determined to his satisfaction that proper freezing methods are superior to the older ones not only in surgical biopsies but also for working up autopsy material. Krause (A Course in Normal Histology) goes even a step further when he recommends frozen methods in the teaching of normal histology.

The Preservative Problem.

In my opinion, the best preservative for tissues is 10% formalin. Other preservatives act too slowly, precipitate pigment into the tissues or fail to penetrate to the center of the lesion. Alcohol penetrates well but falls short for the following reasons:—

1. Its strength, as ordinarily obtained, is variable; and it does not produce the constant picture given by 10% formalin.
2. It destroys erythrocytes and this point is very important in studying surgical material.
3. It interferes with or delays the sectioning and must often be washed out before attempting microtomy.

The Value of Experience.

The surgical pathologist must be a medical graduate. A thorough medical education is essential, and the man who has finished only his laboratory courses is not a safe worker. He must also have completed his work in the clinical subjects, should be especially well read in surgical diagnosis and, if possible, should have done some post-graduate work in these branches. Added to this should be many years' rich experience with tissues, not in autopsy work alone, but in surgical pathology. The worker should be a cellular pathologist as well as a tissue pathologist. He must understand not only cell relationship but also cell morphology, the normal and pathological limits. In a sense, he should be a research worker and should be qualified to follow up certain practical questions in technic.

A few men have the idea that a nurse or pharmacist may attend a six weeks' course in tissue pathology and then make reliable or even clever surgical pathological diagnoses. A few others apparently believe that such laymen may be able to handle the "easier" tissues. I have never seen this succeed, for the mere reason that the surgeon does not usually know whether a tissue examination will prove easy or difficult. It would not be safe to trust a physician who could diagnosticate only typhoid fever.

He who attempts to reach the goal by reference text-book pictures or contrast and comparison mounts secured in a college laboratory from autopsy materials and especially for teaching, will get nowhere for the simple reason that no two pathological tissues were ever exactly alike. For example, tuberculous disease may present all sorts of pictures, and tuberculous disease cannot be diagnosticated by memorizing pictures, but rather by a knowledge of the various principles involved in tubercle bacillus invasion. I have known many pathologists, and intimately known some very good ones; and I believe that no conscientious one of these will deny that now and then he runs upon a hard problem. Certainly it is not an easy specialty.

GAMBLING WITH THE PATHOLOGIST.

Some heresies are old and strongly founded, but exceedingly difficult (for the pathologist) to explain. Any system which aims at an academic testing of the pathologist (especially by one not a close student of pathology) is a very bad system indeed inasmuch as in the gamble, the patient is the loser. The joke may be on the pathologist but not on the undertaker. The surgeon who withholds information concerning the site of the lesion and vital clinical data, may be ignorant of the fact that the science of pathology does not assume to diagnosticate and prognosticate by tissue structure alone; and the following examples, few of many, will show the whys. Colloid vesicles in the thyroid may be regarded as normal but the same tissue in a bone is very likely malignant. A spinous cell carcinoma of the tongue or lip is quickly fatal but on the forehead or finger, it may grow for years and the patient may succumb to some unrelated disease before the carcinoma has given him much trouble. A columnar-cell carcinoma of the large intestine rapidly gives birth to secondaries, but the same growth in the appendix is often entirely cured by appendicectomy. There are other instances, and the surgeon must never fail to state the site of the lesion and its clinical history. Contrary to opinion, these data will not mislead a competent tissue pathologist. In fact, there is always a tendency to challenge the clinical opinion where any opportunity exists, for that would be a feather in the cap of the pathologist.

PORTION OF LESION FOR EXAMINATION.

In a communication in this *Journal,* I considered this question in detail and so will touch only upon the chief points. The surgeon often goes wrong in selecting the portion of excised tissue for examination. A necrotic center, slough or scab is usually quite structureless. Even though cells may be present, it must be remembered that the pathologist is interested also in cell relations. The specimen should include the line of transition between normal and diseased tissue. Thus only may invasive neoplasia be demonstrated. The cut should be perpendicular rather than parallel to the base that a portion of the latter may be included.

CLINICAL VS. PATHOLOGICAL DIAGNOSIS.

My heading is wrong: there should be no difference. Some surgeons place their trust entirely upon the laboratory diagnosis; others ignore the laboratory report and depend upon the clinical manifestations for their final judgment. If they apparently disagree the cause of the disparity should be investigated. If the surgeon is certain of his ground, he should ask the pathologist to re-examine the material or else seek the opinion of other pathologists. In this way, much concerning surgical pathology will be learned. In 90% of all cases, the diagnoses will agree. If they do not, the pathologist has not been supplied with the proper material or instructions or he is in error; and I am free to confess that a pathologist errs now and then, and I will include others beside myself,—those who are too timid to acknowledge the disagreeable truth. Insufficient training or experience may be the reason, and the surgeon is at fault in the selection of his consultant. Usually, however, carelessness or haste is the true cause. Merely glancing at specimens will eventually wreck a pathological reputation: tissue examinations are truly tissue studies.

VALUE OF THE SURGICAL TISSUE STUDY.

Surgeon Simpson does not believe in tissue work. Surgeon Sampson thinks otherwise and sees that it is done whenever possible. The real value of the work lies not alone in case records or avoiding future legal difficulties. One great value of the work is in the disposal of the "return case." The nature of the pathological process known exactly, not only may the surgical specialist venture an intelligent prognosis, but in case the patient suffers recurrence of the trouble, his diagnosis is ready and he can promptly apply rational treatment according to accepted surgical teaching. The surgeon who demands the tissue examination, demands and secures not only the confidence of the patient but especially that of the physician who refers the case to him.

But the chief value of the surgical tissue examination, lies in the perfection of the surgical diagnostician. The surgeon who is satisfied only with his opinion based upon clinical symptoms or the gross appearance of the lesion, learns nothing and profits not at all so far as his future diagnostic problems are concerned. But the surgeon who sees the game through, case after case, is he who will become the clever diagnostician. If a surgeon is a handy operator but a poor diagnostician, I think that we will agree upon how much harm and good he will accomplish.

I have seen it again and again.

North Central Ave.

INJURIES TO THE WRIST AND TO THE ANKLE.

Leo Mayer, M.D.,
New York.

Injuries to the wrist and to the ankle constitute a large proportion of those seen in industrial surgery. Few, if any, require more accurate diagnosis and treatment since the least mistake is likely to result in marked impairment of function. The present paper does not contemplate a report of all the different types of injury but merely a review of some half-dozen different cases illustrative of methods of treatment which, in the hands of the author, have given satisfactory results.

Probably the most frequent injury at the wrist is Colles' fracture. The diagnosis in these cases is so simple as to require little explanation. In the treatment, however, numerous mistakes are common. Those that I have seen most frequently are (1) incomplete reduction of the fragment; (2) immobilization of the fingers; (3) unnecessarily complicated after-treatment. It will be well to consider each one of these separately since in so doing, we shall be dealing (1) with the reduction of the deformity; (2) the retention of the fragments in their normal position with the least degree of immobilization of the neighboring joints; (3) the after-treatment.

In reducing Colles' fracture, the "hand-shaking grip" usually taught in the text-books and in the medical schools is not nearly as effective as the direct application of force to the dislocated fragment. The method of Sir Robert Jones consists in grasping the injured hand as shown in figure 1. The base of the surgeon's thumb is brought to bear against the dorsum of the patient's wrist; the base of the opposite thumb gives resistance on the anterior aspect of the radius. The two hands are forced towards one another with a powerful motion of the shoulders. This grip is particularly effective since it enables the operator to apply all his strength accurately and without danger of undue traumatism. Unreduced cases of several weeks' standing can usually be reduced by this method. In case the surgeon's strength is not sufficient in these old cases, the same principle can be utilized by employing a Thomas wrench, one claw of the wrench acting as the posterior, the other as the anterior lever. Figure 2 illustrates a typical case of Colles' fracture before and after reduction by this method of Sir Robert Jones.

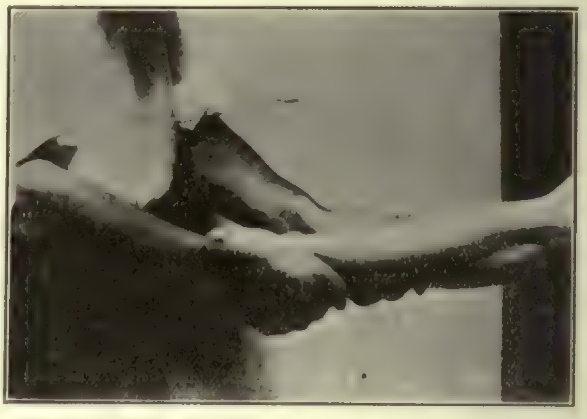

Fig. 1—Photograph illustrating the Sir Robert Jones' method of grasping the wrist in correcting the deformity of a Colles' fracture.

To retain the fragments in the normal position two splints, not extending beyond the fractured bones, are required. The posterior splint has a pad attached to it which presses the dorsal fragment anteriorly, the anterior splint has a similar pad which forces the shaft of the radius posteriorly. These splints can be made of plaster of Paris, but it is simpler to have rounded metal splints of various sizes on hand. These can be used for a great number of cases, are exceedingly cheap, and hold the fragments in accurate apposition. The anterior and posterior splints are held together by several bands of adhesive plaster. No immobilization whatever of the fingers is required.

These short splints render the after-treatment of Colles' fracture simplicity itself. There is no need of massage or of systematic exercises other than those which the patient would naturally tend to take. The splints are left in position three weeks. Then the posterior one is removed and a few days later the anterior one also. The patient is instructed to move his fingers during the entire course of the immobilization and consequently there is no stiffness to be overcome by wearisome massage treatment. The patient should be able to resume work three or four weeks after the injury.

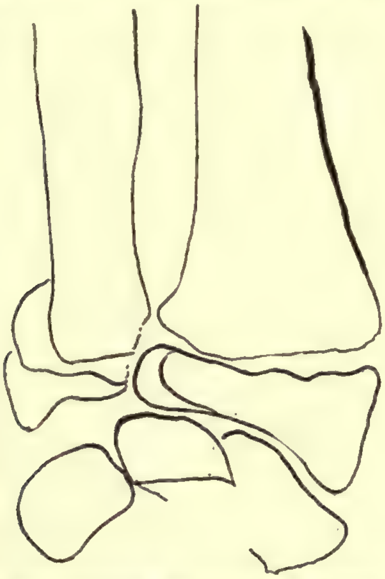

Fig. 2a—Antero-posterior view of Colles' fracture before reduction.

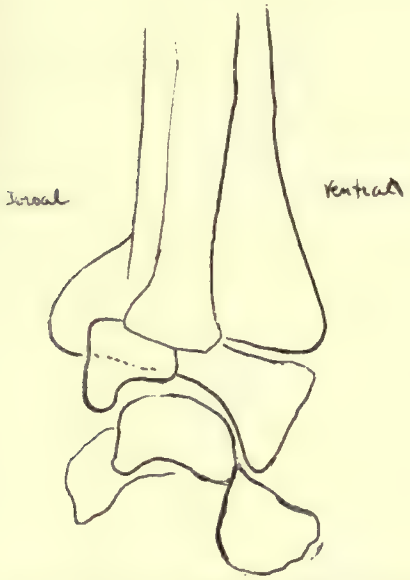

Fig. 2b—Lateral view of Colles' fracture before reduction.

The type of deformity which might be confused with a Colles' fracture is a dorsal dislocation of the wrist. This type of injury I have seen on several occasions, associated usually with the fracture of one or more carpal bones. Figure 3 illustrates a case in point. The patient, thrown violently forward on the outstretched palm while descending in an elevator, fractured the scaphoid and the styloid process of the radius, and dislocated the distal row of carpal bones backward. When first seen there was distinct deformity on the dorsum of the wrist, somewhat lower than that seen in a Colles' fracture. There was marked tenderness over the frac-

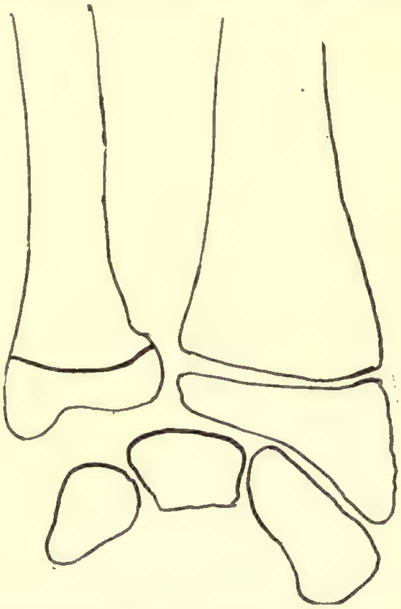

Fig. 2c—Antero-posterior view of Colles' fracture after reduction.

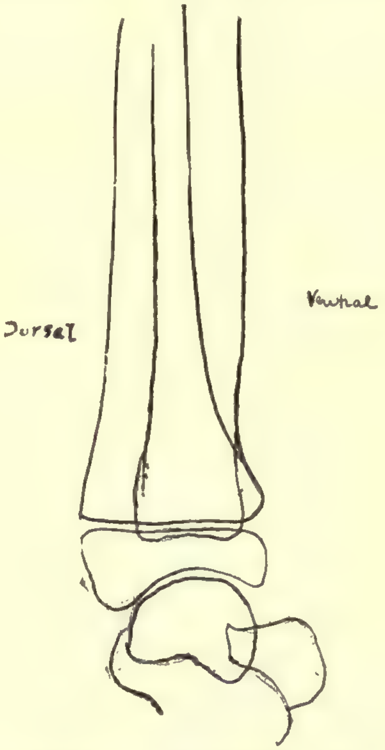

Fig. 2d—Lateral view of Colles' fracture after reduction.

tured scaphoid and radius. Since the fragments of the scaphoid were displaced and there was marked interference with motion, not only of the wrist but also of those tendons which glide over the radial aspect of the hand, immediate operation was decided upon. The fragments of the scaphoid were removed through a two-inch incision running between the long extensor of the thumb and the two shorter extensors. The dorsal dislocation was reduced with an audible snap. A plaster of Paris dressing similar in type to that used in Colles' fracture was applied. Two weeks later this was removed for one hour daily to allow the patient to exercise. Within three weeks he was able to play the piano and to resume his work.

Not all injuries to the scaphoid require operation. The operation is indicated by a displacement of the fragments which interferes with the function of the wrist or of the tendons of the fingers.

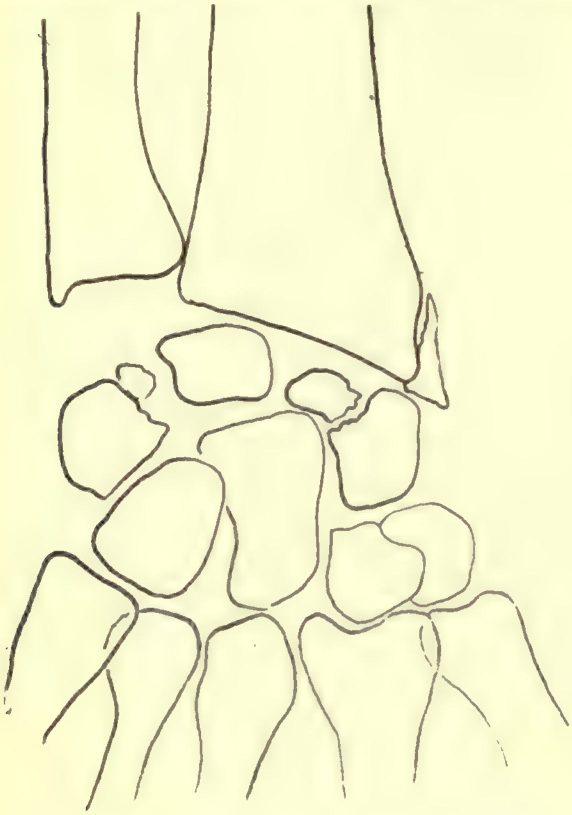

Fig. 3a—Antero-posterior view of fracture of scaphoid and radius combined with dorsal dislocation of the distal carpal bones.

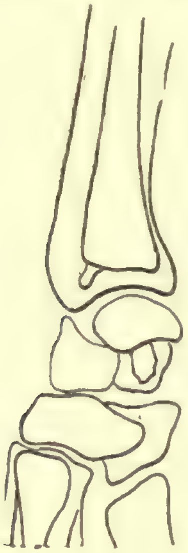

Fig. 3b—Lateral view of fracture of scaphoid and radius combined with dorsal dislocation of the distal carpal bones.

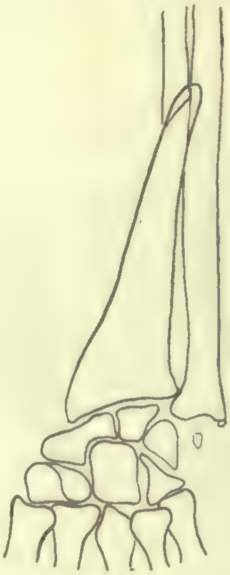

Fig. 4—Skiagram illustrating radial dislocation of wrist complicated with fracture of shaft of radius.

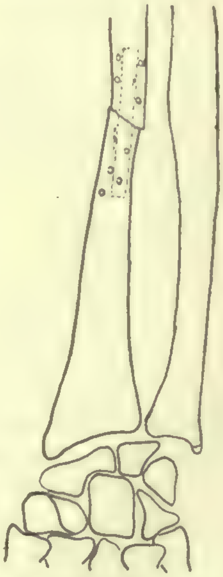

Fig. 5—Same as Fig. 4, subsequent to bone graft and reduction.

Radial dislocation of the hand I have seen in one instance, associated with the fracture of the middle of the shaft of the radius. The styloid process of the ulna presented as a prominent bone, the hand was displaced one-half inch towards the radial side, and there was considerable bowing of the forearm. (See figure 4). The exact mechanism of the accident cannot be stated since the patient remembers nothing other than trying to grasp the reins of a runaway horse. It seems probable that he succeeded in grasping them and that the jerk of the animal gave the hand a marked twist towards the radial side. The patient was referred to me after several attempts had been made by a competent physician to reduce the radial fragments. As none of these had been successful, I operated, fastening the two ends of the radius in alignment by means of a sliding autogenous bone graft. (Albee method). It was then an easy matter by direct pressure over the radial aspect of the wrist to slip it back into the normal position where it stayed of itself. (See figure 5). The functional result in this case has been exceedingly satisfactory: there was bony union in four weeks and the patient returned to work in five.

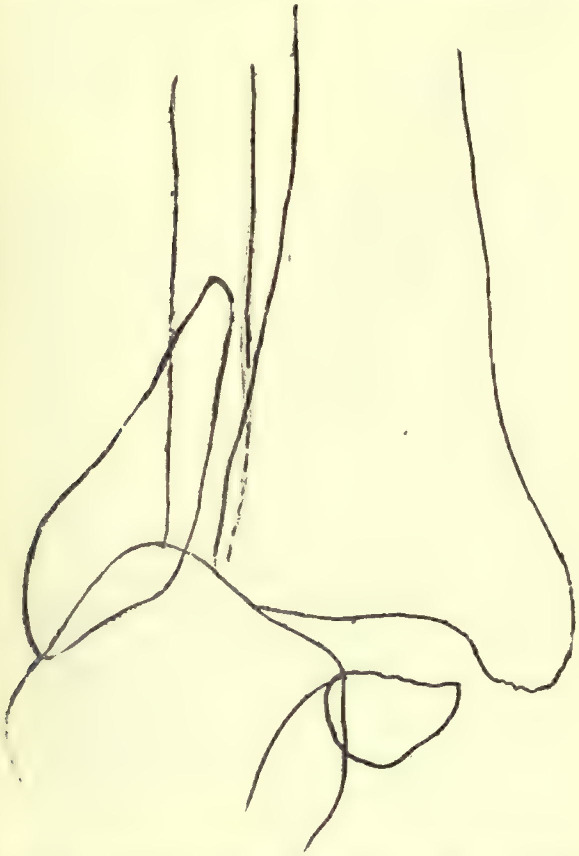

Fig. 6a—Skiagram of typical Pott's fracture before reduction—Antero-posterior view.

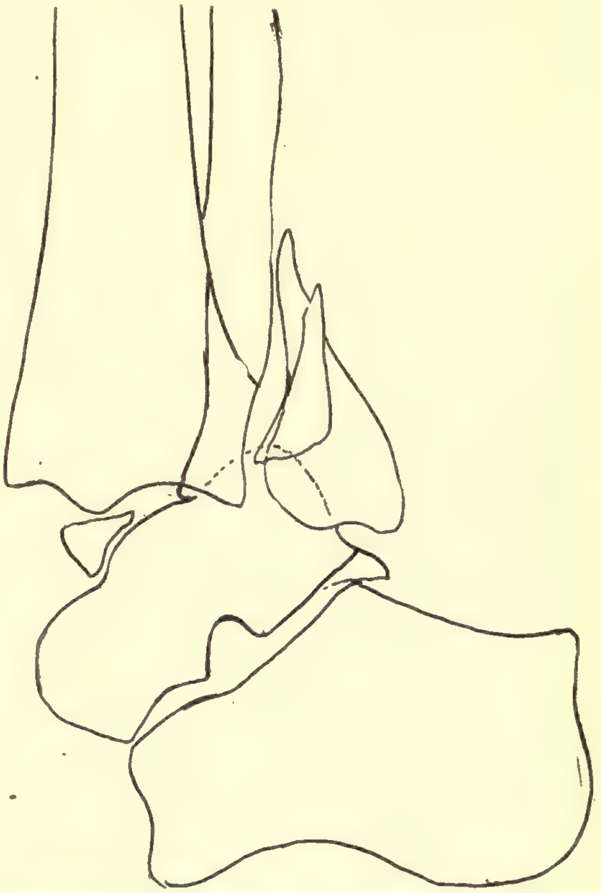

Fig. 6b—Skiagram of typical Pott's fracture before reduction—Lateral view.

As a contrast to these cases of fracture and dislocation are the numerous instances of sprain. Because these do not give röntgenological evidence, their treatment is frequently slighted, though they are liable to cause fully as much functional disturbance as bony lesions. No injuries require more accurate anatomical knowledge than these for their correct diagnosis. The essentials in determining the lesions are palpation and functional tests of all the tendons that might possibly be injured. A specific case will illustrate the method which I employ.

Mrs. W. was referred to me with a diagnosis of arthritis of four months' standing. She complained, it is true, of pain in the wrist, but it was evident at a glance that the wrist itself was not involved since there was no tenderness over the ulnar, dorsal, or anterior aspects of the wrist, but only over the radial side. Palpation of the extensor carpi radialis longior and brevior, failed to elicit tenderness, nor was there any over the short extensors of the thumb. When, however, the palpating finger ran along the course of the extensor longus pollicis the patient complained of severe pain. The diagnosis of sprain of this tendon was clinched by asking the patient to flex the thumb strongly, thus putting the tendon on the stretch. This gave pain and the same motion passively performed had the same effect. Active extension of the thumb against resistance also caused discomfort.

The general principles underlying the treatment of sprains are (1) immobilization of the part in such a position as to afford a chance for healing with retention of the normal length of the injured structure; (2) application of moderate pressure to the injured structure so as to prevent formation of exudate, or in older cases to aid in its absorption.

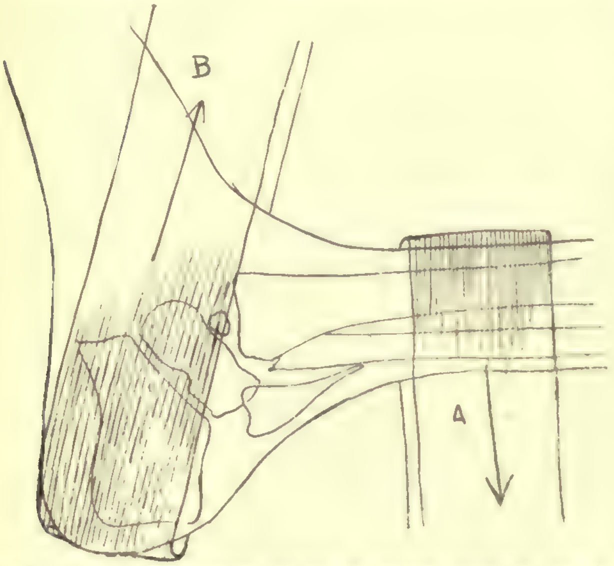

Fig. 7—Diagram illustrating method of applying slings to foot in dressing for Pott's fracture. (a)—Sling held by operator's foot. (b)—Sling passing over operator's shoulder.

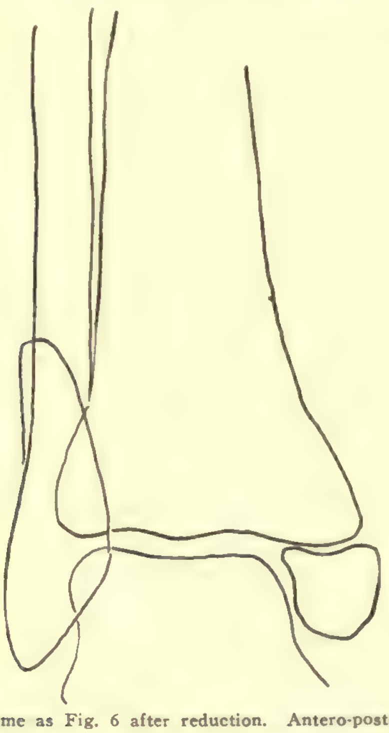

Fig. 8a—Same as Fig. 6 after reduction. Antero-posterior view.

For the particular injury just described, the thumb was held in much the same position one assumes for grasping a pen or pencil. Firm adhesive plaster strapping was applied from two inches above the wrist to the tip of the thumb and in addition a light mold of plaster of Paris served to retain the finger in this restful position. Within a week the pain had subsided and the tenderness had become much less. In two weeks the tenderness had entirely disappeared. Several weeks longer, however, were required before function of the finger could be permitted.

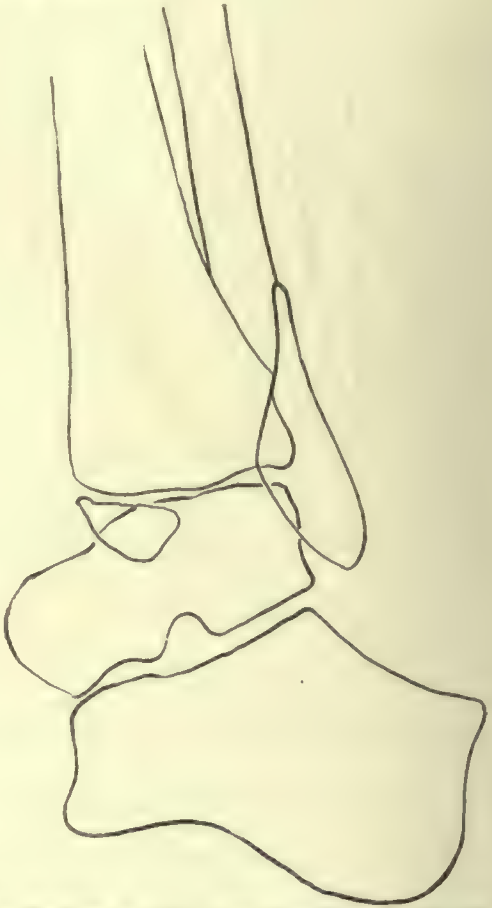

Fig. 8b—Same as Fig. 6 after reduction. Lateral view.

At the ankle joint Pott's fracture corresponds in frequency with Colles' at the wrist. Of the many cases I have seen, none has required operation despite marked displacement of the fragments. It is, I think, comparatively easy to secure almost perfect results by manipulation alone. As in Colles' fracture, it is necessary to reduce the fragments completely and to hold them accurately in their normal relationship. Figure 6 shows a typical case with somewhat more than the usual amount of lateral displacement owing to the fact that the patient walked several blocks on the injured foot. It is evident that there are two elements in the deformity—(1) lateral displacement, (2) posterior displacement. A correction of one is fully as important as that of the other. Two corrective motions are therefore required: (1) a sharp inward twist of the entire foot; (2) a forward pull on the heel combined with a dorsal shove on the shaft of the tibia. The foot must be held inverted and dorsally flexed, otherwise the fragments are bound to slip. When working with unskilled assistants, I prefer holding the fragments in position myself while applying the plaster-of-Paris dressing. This I do by means of two slings passed as indicated in the diagram, figure 7. Sling (a) passing over the posterior surface of the tibia, I press upon with my foot, thus drawing the tibia towards the floor; sling (b) passing around the os calcis, I draw towards the ceiling by passing it over my shoulders. Figure 8 is a skiagram of the case shown in figure 6, after reduction by this method.

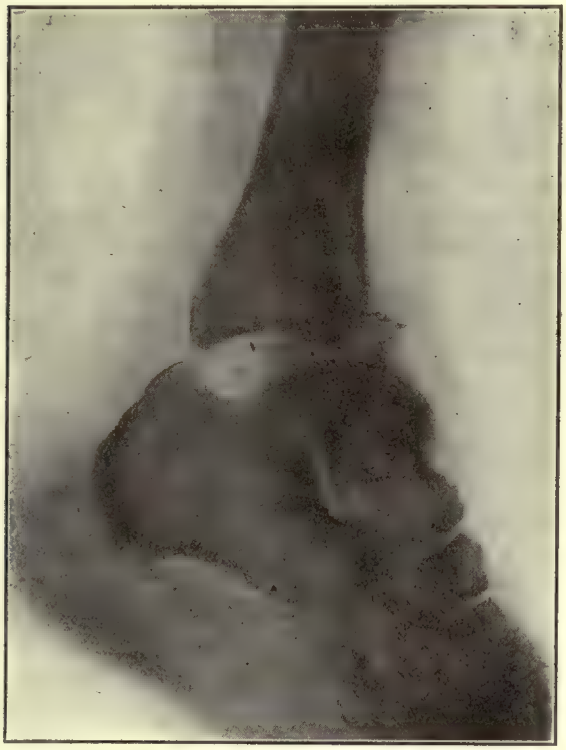

Fig. 9—Skiagram illustrating forward displacement of astragalus complicated by non-union of fracture of fibula.

Injuries to the astragalus ought not to be confused with Pott's fracture, but they frequently are. I have even seen a case demonstrated to a large class as a typical instance of Pott's fracture which was in reality a fracture of the astragalus. The *x*-ray, of course, gives the conclusive evidence. When the fragments are markedly displaced, no operation is as effective as astragalectomy. If their apposition is good, excellent results will be secured by simple fixation.

Dislocations of the astragalus are rare deformities. I myself have seen only one, a case in the service of Dr. Walter M. Brickner at the Broad Street Hospital, New York. This belonged to the extremely rare type of anterior dislocations of which only ten or fifteen have thus far been recorded. It was complicated by a fracture of the fibula about two inches above the ankle joint with a forward displacement of the lower fragment. (See figure 9). The heel of the patient appeared flattened, the internal malleolus was unduly prominent, the bulge of the astragalus could be distinctly felt anterior to the tibia and there was interference with dorsal flexion. A correct diagnosis had not been made at the time of the accident and when first seen by Dr. Brickner, some two months later, it was impossible to reduce the deformity by manual manipulation or by apposing the fibular fragments by open operation. Further attempt to reduce the dislocation by means of a Thomas osteoclast also failed. Open operation was, therefore, performed. The astragalus was found displaced about one-half inch forward. Even after complete division of all of the ligaments holding the astragalus in place, it was impossible to correct the deformity. The astragalus was, therefore, removed, the entire foot displaced backward, as in the typical Whitman method, and a plaster dressing applied holding it in this position. It is still too early to report the functional results in this case.

THE ADRENALIN TEST FOR HYPERTHYROIDISM

For three years Goetsch, of the Surgical Clinic of the Johns Hopkins Hospital, has been practicing the subcutaneous injection of 7.5 minims of a 1-1000 solution of adrenalin chloride in patients who present marked symptoms of hyperthyroidism but in whom no positive diagnosis can be made by ordinary methods of examination. If the patient, following the adrenalin injection, reacts with manifest symptoms of hyperthyroidism. Goetsch believes that a positive diagnosis of the condition is justified. The test is a valuable aid in determining whether the disease from which patients are suffering is purely a tuberculosis, a tuberculosis complicated hyperthyroidism, or a pure hyperthyroidism. Hyperthyroidism, whether or not associated with tuberculosis, will give a positive reaction to adrenalin. Tuberculosis, uncomplicated by hyperthyroidism, does not react positively to adrenalin.—Nicholson, Clive and Goetsch, in *The American Review of Tuberculosis.*

SURGICAL REFINEMENT AND IMPROVEMENTS, INCLUDING SOME FEATURES DEVELOPED BY MILITARY SURGERY*

Thos. O. Burger, M.D.,
San Diego, Cal.

During my service of ten months in cantonments, in France, in casual camps and on the voyages to and from France, it was my privilege to meet several hundred medical men and invariably the most discussed topic was the future of the medical profession as regards changes and methods that are inevitable. Personally, my observations lead me to think that the correlated information which the Army presented through the medical fraternity, disseminated through the nursing corps and especially through the corps men, to the entire Army, will result in an enlightenment that will extend to the entire population of these United States. I must say that not all the medical men or all of their work was up to the standard, and some just criticism will tend to discredit the profession in the future, but on the whole, I feel that a salutory effect is to be expected.

The Army certainly awakened many medical men to the fact that they were in a rut and they will start over with a resolve to do better work—work that will stand the criticism of a more enlightened public. Questions of sanitation will be more easily handled. Epidemiology, and in fact all preventive medicine, will be given their proper attention and this by the way, brings us up to surgical considerations in the same light. With the opportunities that are to be had at the present time, any physician who attempts surgery, may learn a technic of varying scale. Also with so many doctors claiming to be surgeons, there is a big field from which the layman can choose.

While competition and the high cost of living are both increasing the surgeon who lasts will be the one with the conscience and whose final results will stand the test of time. Haphazard methods in hospital management and record-keeping will soon be a thing of the past. Standardization will come, —not for all hospitals perhaps nor will it be desired by all doctors, but I emphasize that both the institution and the man who has a conscience must embrace it.

This means that every case will be recorded as to why operated upon, along with complete data as to history and a description of the operative procedure. In black and white, open security will be the *results*. Since such an era is dawning, it is time for our profession, as represented in San Diego, to get in line. We all know and admit that operations are performed unnecessarily, improperly,—and without attempt at thorough diagnosis. Conditions are not fully weighed with consideration of the procedure best suited to that particular case. That the surgeon must have the cooperation of the internist, pathologist, roentgenologist and dentist is recognized as a necessity by those who desire to do conscientious, intelligent surgery. Focal infection may have been overemphasized in the last few years, but I doubt it. Internal secretions have not been sufficiently considered, but these things along with other essentials in the medical domain must be weighed in forming the basic element of the highest and most valuable surgical quality of today, which is preeminently and without doubt *surgical judgment* Is an operation to be done, when is it to be done, by what method, with what anesthesia, and with what other adjuncts so that the patient gets the greatest benefit with the least disturbance, risks and discomforts?

The general practitioner has progressed so far from those of the past that he is unwilling to submit his patients to be operated upon by a man whose end-results are more often than not, unsatisfactory through faulty diagnosis or poor surgery —e. g., removing an appendix when a calculus in the right ureter continues to cause the same distress and pain as before the unoffending appendix was removed.

Roentgen rays and radium are showing sharp competition with surgeons especially those who deal with the female pelvis, and one must learn when to yield his surgical skill to the application of these potent energies.

The surgeon who gives ether in every case and who follows the same procedure for every patient is in the same class with him who starves and purges each patient as a preparation for the operation. Such a surgeon is not modern and in addition is not even ordinarily observant else he would see the emergency cases which have no time for such depletion and disturbance of intestinal balance recover with less disturbance and in shorter time than the ones prepared in this usual crude way.

In my abdominal work my patients have had so few gas pains, (in many instances, absolutely none,) that some have sneered and even doubted when I have declared such to be the case. I do not upset the intestinal tract by purgation (in constipated patients I may give castor oil two days before) and I permit food up to the evening before which helps prevent acidosis. I do not handle the abdominal contents roughly or unnecessarily, nor do I pack gauze into the abdomen when it is possible to avoid this. I do not allow the intestines to lie on the bare abdominal wall or on iodized surfaces. Where the surfaces are necessarily exposed, I cover them with warm, wet gauze and I never leave a raw surface or peritoneal suture line in contact with the intestines if a mobile omentum is available for protection. These details, with some others, leave my patients practically free from gas pains and postoperative adhesions.

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*Notes from an address before the San Diego Co. Medical Society, June, 1919.

I will briefly discuss some of the outstanding improvements made in war surgery. Of most value and distinctly a new procedure is "débridement"—which was developed by the French early in the war. It was observed that cases that had been left on the battle-field in which maggots had eaten away all dead tissue, showed less infection and recovered more rapidly than those more repulsively infected and this gave foundation for the débridement treatment which simply means cleaning out all devitalized tissues.

All wounds produced by shell, or shrapnel, were potentially infected, and the procedure or débridement, meant not only removing all foreign material, but all flesh whose vitality was questionable even if it did not show foreign material or infection. This may be done early or may be done later. It was particularly demanded in gas infection—here very extensively. After thorough cleansing, some antiseptic or application was used. Morrison's paste or "Bipp" was popular with many surgeons. The iodoform no doubt exerted an antiseptic effect, though the paraffin was considered of most value in making an escape for secretions. Suturing was done in a very careful way, passing the needle so that no undue tension was produced, but at the same time so that no dead space was left, and also not so close that secretion and paraffin might not make its way to the surface. The wounded member was placed at absolute rest and kept so for a number of days.

Suturing large wounds as indicated above will result in primary union in more than 80% of cases.

Many of us have been convinced strongly regarding the Carrel-Dakin method of caring for wounds. Personally I was shown in the Base Hospital where I was stationed that this is a superior method of dealing with infected wounds, though only when used in a superior way to that carried out in the ordinary hospital or by the average doctor or nurse. The solution must be chemically right, the tubes properly made and placed, and with extreme care to all details, or the effort results in failure and may cause further irritation. I feel that in the usual surgeon's civilian practice dichloramine-T. is the preferable chlorine antiseptic to use.

The war has also shown the need of more frequent use of antitetanic serum, immediately after wounds, for repeated use in certain suspicious wounds, and preliminary to operation in old injuries where a dormant tetanus infection may be stirred up.

The aggregated cases of empyema in cantonments afforded opportunity for much study and comparison and great improvement in their treatment was effected. I feel that the instrument devised by Dr. Victor P. Dieterich for dealing with pus in the pleural cavity, not permitting air to enter, is of great benefit. While at Letterman Hospital I tried to do away with the pneumothorax and used a trocar getting the same results that Dr. Dieterich's trocar does, but with less facility.

Many other improvements will develop by reason of new methods evolved in military surgery, but of most value will be the enlightenment of a large number of doctors who have needed just such a stimulus to arouse them.

Surgery of the future will be more thorough, through greater cooperation, because laboratories have become an absolute essential to the surgeon—more clinical and *x*-ray men will be available and the truly progressive surgeon, as well as the internist, will find increasing demand for his services by the more enlightened public.

1200 AMERICAN BLDG.

ACUTE THYROIDITIS.

Acute thyroiditis, whether occurring in the normal gland or in a pre-existing tumor or hypertrophy, is of comparatively rare occurrence. At first thought, this fact might be difficult of explanation, for the close proximity of the gland to the pharynx, tonsils and lymphatic structures of the throat might well be expected to predispose to infections within the thyroid gland by direct lymphatic extension. A study, however, of the lymphatic supply of the thyroid demonstrates that there is no direct lymphatic circulation between the structures of the throat which are so commonly the seat of acute infections and the thyroid gland.—GEORGE E. BEILBY in the *N. Y. State Journal of Medicine.*

RHINOLOGIC CONSIDERATIONS FOR THE GENERAL PHYSICIAN AND SURGEON.*

Frank Albert Burton, M.D.,
San Diego, Cal.

This paper is intended for physicians in general practice. In treatment, the paper deals almost entirely with the surgical side of rhinology, but it should be remembered that non-surgical treatment plays an important rôle in rhinological practice.

In the consideration of this subject, effort is made not so much to direct attention to anything new in rhinology, but especially to consider the avoidance, as far as possible, of unnecessary surgery upon useful structures and most of all to urge greater care in the matter of rhinological diagnosis.

From recent observation I assume that even yet too many general practitioners and some beginners in rhinology are sacrificing turbinated bodies when the fundamental cause of the nasal symptoms under consideration is not with the turbinates *per se*. Deviated septa, infected sinuses, diseased tonsils, root abscesses, or hypertrophied lymphoid tissue in the nasopharynx, are often primary causes of nasal stenosis. Tertiary syphilitic manifestations and diseased or abnormal conditions of other structures causing turgescence of the turbinates, must receive attention. Conditions producing symptoms which, when associated with some form of rhinitis, make it difficult to determine the fundamental etiology, demand special consideration. Sphenopalatine ganglion neuroses must not be overlooked. Headaches and eye conditions of nasal origin, must receive studious attention.

In the important matter of diagnosis, sufficient time and great care should be given. Where purulent sinuses are suspected, too much reliance should not be placed upon transillumination, astringents and negative pressure. The *x*-ray should also be employed. Snapshot diagnosis and following the lines of least resistance in rhinological practice are vicious habits. In the recent army draft a goodly number were refused admission into the service because of loss of, or marked impairment in, functions of the turbinated bodies due to surgical interference.

It is not my purpose at this time to discuss the different methods of surgical attack upon the turbinated bodies, but rather to urge that the turbinates be exempted from any surgical procedure whatever until painstaking examinations determine them to be unmistakably at fault in the causation of symptoms from which the patient is suffering. And when it is determined that in a given case impairment in nasal respiration, nasal drainage, or symptoms of nasal irritation, call for surgery of these important structures, that one consider well their functions and do that which will produce the desired results with the least possible loss in nasal physiology.

All are familiar with the anatomy and physiology of the turbinates, but a few general statements with reference to their physiology will serve to refresh our memories and contribute to the purposes of this paper.

When one considers the important functions of the turbinated bodies as well as the far-reaching and detrimental results from loss, or even serious impairment, of their physiology, he can but exclaim, "What wonderful and what valuable structures! What a wise provision of Nature to provide in this splendid way for the tempering and moistening of the inspired air!" When one reflects that the turbinates also contribute very largely, through special moisture supply, to the efficacy of this tubal air filter for the removal of dust and bacteria from the air one breathes, the importance of conservative treatment of such necessary structures is obvious.

In the consideration of nasal pathology it is important to recognize among other things, the difference in appearance between intumescence and hyperplasia of the turbinates, as well as to note the difference in response to local application of adrenalin and cocaine. In intumescence the color is pink, almost red, the surface is smooth and even, the erectile tissue shrinks to normal dimensions on application of adrenalin or cocaine, and with nasal probe no movable tissue is demonstrable at the inferior border of the turbinates. While with hyperplastic rhinitis the turbinate surface is pale pink, often bluish pink, nodular, or at least uneven, and on the application of adrenalin or cocaine fails to shrink to normal size, and leaves movable tissue at the lower edge of the turbinate bodies, and by means of the probe one can determine the extent of the hyperplasia.

If the cause of turbinate congestion is improper ventilation, sedentary habits, pus bathing, or chemical toxins from empyema of one or more of the nasal accessory sinuses, negative pressure on account of a deflected septum, or non-use of the nose from post-nasal obstruction, it is obvious that turbinate surgery will fail to give relief and unless it is most conservative, will impair nasal physiology. In such cases the turbinate manifestations are only symptoms, and removing part or all of such turbinates will have but little influence upon their etiological factor. Nervous individuals are frequently affected with hyperesthetic rhinitis, hay fever, and intumescent rhinitis. In the matter of rhinological diagnosis and treatment in such cases, one does well to also take the nervous factor into account. The erectile tissue of the nose should respond to slight changes in atmospheric conditions. Lack of vasomotor control often results in nasal respiratory unbalance. Certain stimuli cause vasomotor dilatation and the nasal erectile tissue fills with blood. Certain other stimuli produce vasomotor constriction and this tissue is depleted of its blood.

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*Read before the Southern California Medical Society at Riverside, May 15, 1919.

From continuous vasomotor dilatation of the turbinates, venous stasis results. Venous stasis is the most frequent cause of nasal stenosis. In a given case the fundamental question is what causes the venous stasis? Not infrequently this condition results from negative pressure due to a deviated septum and since the suction thus exerted is constant, it need be but slight to produce serious consequences. In breathing dry air in overheated rooms, the turbinates are whipped into great activity in their effort to moisten the inspired air. Individuals continuously subjected to such air have constant vasomotor dilatation, impaired tone of nasal erectile tissue, and resulting venous stasis. From lack of vasomotor control nasal respiratory unbalance takes place, and often there is alternating nasal stenosis, one of the classic symptoms of intumescent rhinitis.

Intumescent rhinitis is due to lack of tone and loss of vasomotor control with practically continuous relaxation of the contractile elements of the erectile tissue of the nose. Improperly heated and ventilated apartments, sedentary habits of life, or the reverse—overdoing physically or mentally to the point of fatigue—worrying excessively, too much society and too little sleep, through lowering vitality and tone, are important causative factors of intumescent rhinitis. A deflected septum may be the fundamental cause of congestion or hyperplasia of the turbinates and direct cause of blocking sinus drainage, resulting in acute sinus infection as well as accounting for the fact that the infected sinus fails to heal spontaneously but develops into a chronic process. Continuous hyperemia, with consequent hypernutrition, account for the hyperplastic condition of the turbinates.

Pharyngitis, laryngitis, tracheitis and bronchitis are often due to great impairment in or loss of turbinate function, as well as to mouth-breathing from nasal or post-nasal obstruction. In either case there is failure in the proper preparation ot the inspired air, due to impossible turbinate function.

In nasal stenosis, from whatever cause, to provide the proper aeration of the blood through nasal respiration, excessive nasal respiratory effort is necessary, and when stenoses are due to deviated septa there are certain to be negative pressure points, causing vasomotor dilatation followed by venous stasis, resulting in intumescent rhinitis.

Where the nose is narrow, due to constriction of bony frame-work, the inferior turbinates may swell so as to completely close the nostrils and make mouth breathing necessary, even though the normal air current is higher up in the olfactory region on a level with the middle turbinate. This condition may also interfere with the sense of smell and the sense of taste. Pressure of middle turbinate against septum by catching the olfactory nerve filaments is perhaps most often the cause of impaired smell, but it should be remembered that in a large per cent. of the cases pressure is primarily due to a deviated septum or septal ledge, and submucous resection is the indicated intranasal surgery, not turbinectomy or even turbinotomy.

Unless one acquires the habit of very great conservatism in surgery of the turbinates, he will too often choose turbinotomy or even turbinectomy, when submucous resection of the septum, sinus surgery or some surgery or treatment not turbinal, should have been the procedure of choice, and later prove to be necessary, and surgery of the turbinates prove too late to have been unjustifiable.

Many laymen consider mouth breathing harmless, and though nasal respiration be impossible, unless the nose bleeds or causes dicomfort in some way, they fail to consult a rhinologist. The teaching of nasal physiology should be given the emphasis that its importance demands.

It has long been recognized that nasal reflexes are often due to contact of the mucous membranes of turbinates and septum. In the vast majority of these cases it will be found that deviated septa are the primary causes and call for submucous resection rather than turbinotomy. Contact points between turbinates and septal spurs and ledges are best corrected in most cases by submucous resection, as there is nearly always a deviation of the septum associated with these conditions. Likewise, synechia between the turbinates and septum is often due to septal deviation and in such cases is best corrected by submucous resection.

Several different ear conditions are often caused by nasal stenosis, and not infrequently venous stasis of the turbinates is the direct cause, while the fundamental etiology is deviation of the septum, infected sinus or conditions other than of the turbinates themselves.

Every rhinologist has seen cases of turbinate turgescence or hyperplasia due to the several causes enumerated above. I shall report a case or two illustrative of the necessity of great care in the matter of diagnosis:

Mrs. R. was referred to me for relief from pain behind the left mastoid and from frontal and temporal headaches. In an effort to remove the cause of her symptoms, another oto-laryngologist had performed a tonsillectomy without benefit. Eye findings were negative. Upon careful examination of her ears, nose and throat I failed to find objective pathology sufficient to account for her symptoms. There was pressure contact of the left middle turbinate against the nasal septum and outer wall of the nose. The septum was in the median line. It appeared that the impairment in ventilation and sinus drainage, as well as possible nasal reflexes thus produced, could be relieved only by middle turbinotomy. Following my habit, however, of making still further investigation when the sacrifice of turbinate tissue seems necessary, the case was studied from the neurologic aspect. The young woman was very neurotic. Investigation from this point of view resulted in a diagnosis of spheno-palatine ganglion neurosis. I applied a swab of 90% cocaine over the ganglion after the method of Sluder, but as this aggravated rather than decreased the symptoms, I did not inject Meckel's ganglion. A middle turbinotomy was done, but instead of giving relief it appeared to accentuate her headaches. The patient had had a negative Wassermann reaction, but after consultation with a local nerve specialist she was put on anti-luetic treatment, showed improvement for several months, but at last report was suffering as before.

For some time the inter-relation between the turbinates and the generative organs has been recognized. The following case is of interest in this connection:

Mrs. A., a young newly married woman, was referred to me for nasal stenosis. Upon careful examination the turbinates, especially the inferior, were found engorged with blood. Upon application of cocaine they diminished to normal size and there was no movable tissue at their inferior borders. There was a marked deviation of the septum which was presumed to be the primary cause of the intumescent rhinitis. A careful, thorough submucous resection was done and the nose properly treated until healing was complete. Several weeks following the date of the post-operative healing the patient reported but slight, if any, improvement in nasal respiration. Further careful study of her nasal condition was made and the conclusion reached that sexual irritation might be a factor. A heart-to-heart talk with the husband was soon fraught with much more favorable results than the supposedly much-needed submucous resection. A few months later the young woman reported complete relief from the nasal stenosis. It is possible and probable that the submucous resection was a factor in this eventually, favorable outcome, but I believe only a factor.

I have observed other cases in which there was obvious inter-relation between turbinated bodies and sexual irritation.

From the viewpoint of turbinal congestion from gastro-intestinal intoxication the following case is of interest:

Miss J., teacher, under treatment for chronic catarrhal otitis media, suffered from time to time with intestinal fermentation. At the time of these spells of indigestion she had "stuffiness" of the nose, as well as increase in her ear symptoms. I had the opportunity of examining her turbinates during two intestinal attacks, and each time there was increased redness and marked turgescence of these bodies.

From time to time turgescence of the turbinates and certain other nasal conditions, are due to chemical toxins from root abscesses or pyorrhea and the services of a competent dentist are imperative. I feel that too much emphasis cannot be placed upon this point, because not infrequently general physicians pay but little attention to the pathology of the mouth. As a natural consequence, in conditions under treatment, caused by mouth foci of infection, the patient fails to obtain the result to which he is entitled.

No examination should be considered complete without investigation of the teeth.

The following hypothetical case, a victim of civilization, represents rather a large list of patients who call upon the oto-laryngologist. The patient may be male or female, but is more likely to be the latter. She is absolutely afraid of fresh air and keeps her room temperature regularly at 70°. The room is heated by steam, gas stove or oil heater with flame exposed. She is positively terrified when she has any symptoms of a cold, at once runs the temperature up to 75° and maintains this temperature day and night for twenty-four to forty-eight hours with doors and windows closed. She never gets out into fresh air without heavy wraps, indulges only in shallow contracted breathing, prefers to ride, and if she walks moves slowly. She has but little appetite and what she eats is unwisely chosen.

Constipation results, and there is more or less toxemia from the gastro-intestinal tract. She is terrified at cold water, and takes only warm baths in a hot room. Such an individual is certain to develop intumescent rhinitis and sooner or later visit the rhinologist. When she calls there is often a mistake in diagnosis and consequently in treatment, due to failure in locating the underlying cause of turbinate condition. In the supreme matter of rhinological diagnosis cooperation should be obtainable —cooperation of patient, general physician, dentist and rhinologist.

It is true that surgery of the septum is frequently indicated and when indicated and properly performed, improves and never impairs nasal function, but it should be remembered that no septal surgery is justifiable without sufficient symptoms traceable to the septum as a causative factor. The fact that the septum in a given case is a little out of line, or even considerably out of its normal shape or position, is not sufficient reason for surgical attack. When turbinates are enlarged one should determine the fundamental cause, remove the cause and save the turbinates from surgical interference if practicable.

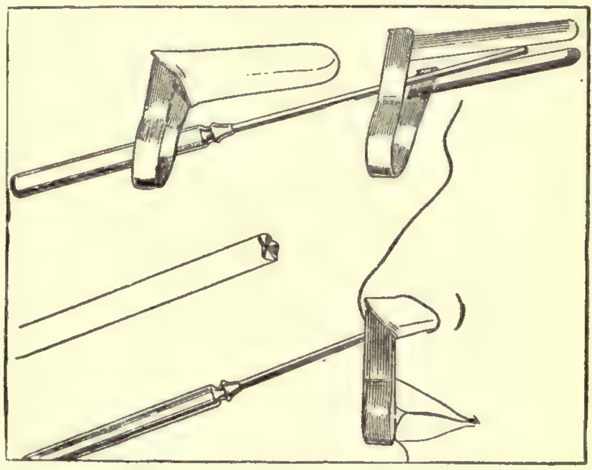
The delicate nature of the mucous membrane of the nose should be constantly borne in mind and unnecessary traumatism in nasal treatment or surgery should be avoided. The general practitioner and the surgeon is frequently called upon to control nasal hemorrhage and too often he attempts to pack the nose without good reflected light, nasal dilator and other necessary instruments.

In successfully controlling nasal hemorrhage the first step is that of determining the location of the bleeding point; next, the application of astringents or pressure upon the bleeding area; then, when the hemorrhage is controlled, applying a chromic acid bead to the point from which the blood was escaping. For several days following this the involved area should be kept soft and moist by applications of sterile petrolatum *ad libitum*. This can be done by the patient or another member of the family.

Nose bleed is most frequently from the anterior third of the septum and a septal ulcer is usually the cause. In nasal bleeding of elderly people high blood pressure often demands attention. To prevent traumatism all nasal packing, whether post-operative, to control nasal hemorrhage from other traumatism, or intransal splint in fracture, should be within rubber tissue finger cots, or by cigarette-shaped gauze packs rolled in rubber tissue, or strips of gauze thoroughly impregnated with sterile petrolatum. This provides for comparative freedom from traumatism and the removal of packing will be free from pain and probably unassociated with bleeding. To facilitate packing of nose within a rubber tissue cot I have devised a simple, inexpensive instrument (made by B. Mueller & Co.,) for holding the cot open in the nose while the packing is being placed also a simple nasal packer. These instruments serve their purpose well. (See illustration.)

Post-nasal packing is seldom required and should not be done unless absolutely necessary. Nasal or post-nasal packing should be removed within twenty-four hours.

When surgical relief from chronic foci of infection is sought, it should be remembered that immediate favorable results are improbable. A body permeated with chemical toxins cannot with reason be expected to recover immediately upon the removal of the source of infection. Time is a factor. Careful attention to the processes of elimination should be given.



The use of chemical and galvano-cauterization in the nose is sometimes indicated, but when employed it should be with care and caution. Opposite mucous surfaces must not be cauterized and only the smallest area conservative with results to be attained.

In the nose the cautery is used but little, by rhinologists. By the general physician it is used too much, with resulting impairment of nasal function. Not infrequently a patient tells us of some physician "burning out his nose" and occasionally we learn of a physician's effort to overcome nasal stenosis by dilating the nostrils with forceps.

This is an age of specialization in every department of life and in medicine and surgery one is attempting to cover too much territory, who specializes "in diseases of men, women and children."

No general surgeon should try to do the surgery of the specialties for he cannot do it in a creditable manner. One who is a leader in general surgery is not likely to indulge in rhinological surgery. It is usually the mediocrity in general medicine and surgery who attempts to cover the whole field. He is not qualified to perform a submucous resection, so he follows the line of least resistance and attempts to overcome impairment in nasal respiration by removing the inferior turbinate on the side of convexity of the nasal septum—or he removes the inferior turbinates on both sides—disaster results.

In a given case turgescence of the turbinates may be rightly ascribed to chemical toxins from diseased tonsils. In such a case nothing less than complete enucleation of the tonsils will bring the desired results. From the viewpoint of focal infection, tonsil stumps may do even greater harm than before operation.

In rhinology, trustworthy diagnosis and competent medical and surgical treatment require special judgment and skill only acquired through definite competent training, study and experience.

It would be just as reasonable for a rhinologist to perform laparotomies as it is for general surgeons to do submucous resections, accessory sinus operations and surgery of the turbinates, and in either case the imperfect surgery and the disastrous results to the patients would be silent profanity against the unqualified operator.

Only in districts unsupplied by specialists should the general surgeon attempt rhinological surgery and even then he should, if possible, obtain the services of a competent rhinologist a day or so a week or month, as conditions demand.

In conclusion: Judicial treatment of turbinate bodies rarely calls for turbinectomy. From time to time in hyperplastic rhinitis, purulent involvement of the ethmoid labyrinth and some other intra-nasal conditions, middle turbinectomy is indicated. Inferior turbinectomy is almost never indicated. Middle and inferior turbinotomies for purposes of nasal ventilation and drainage, as well as for removal of nasal reflexes, are more often needed. No turbinectomy, turbinotomy, or any intra-nasal surgery whatever, should be done except after thorough, painstaking examination and careful diagnosis.

SOME PHASES OF ROENTGENOLOGY AND RADIOTHERAPY.

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From the time when radium was discovered by Madame Curie steady advancement has been made in the therapeutics of this agent. It has supplanted the *x*-ray in some instances, and has certainly incited the manufacturers of *x*-ray machines and tubes to greater efforts to compete with its therapeutic value.

The part which the *x*-ray plays in the diagnosis of bone lesions is well established, and its use is so universal by those who desire to do the best work that this phase of the subject need not be especially considered. However, it is well that the surgeon remember there are lesions, such for instance as those in beginning Pott's disease, where destruction occurring in the overlying soft structures will not be visible in the roentenogram of the vertebræ, and under such circumstances one should not rely entirely upon the *x*-ray diagnosis.

In fractures and dislocations the surgeon who first determines by roentgenoscopy the exact condition present, and after correction or reduction checks his work by another examination, should naturally obtain the best results. The aid which the *x*-ray affords in the differentiation of osseous lesions is well known to all of us.

In abnormalities of the gastro-intestinal tract there are certain signs whereby the roentgenologist may make a positive diagnosis; but in most instances after he has rechecked his work to guard against error,—with plates, anti-spasmodic solutions and subsequent examinations,—he can only report his findings to the internist. This is especially true when examination is made to determine if possible the presence or absence of calculi in the gall-bladder, or the urinary tract, present roentgenoscopic methods being inadequate to demonstrate more than thirty-three and one-third per cent. of the concretions actually existing in these situations. Therefore, the internist should make the final diagnosis based upon his interpretation of the data obtained by clinical and anamnestic investigations.

When a patient is referred to the roentgenologist, under the assumption that he can positively determine whether or not calculi are present, the patient is confused when the surgeon receives a negative report—and at operation a number of calculi are discovered. This is also true when the patient, knowing of the negative report, refuses surgical intervention despite the fact that all the clinical symptoms indicate the presence of calculi. In such instances the clinician may sometimes conclude that the roentgenologist failed in proper execution of his part of the work. How easily this confusion could be foreseen and obviated if the clinician and the surgeon would frankly explain the facts to the patient, and especially the part which the *x*-ray plays in diagnostic confirmation under such circumstances. The patient could then go to the roentgenologist fully understanding his status and not regard the report of the laboratory as final evidence which so frequently happens under present conditions.

The interpretation of chest pictures has always been a source of controversy among roentgenologists. There are workers in this line who make a positive diagnosis of pulmonary tuberculosis based upon the presence of peri-bronchial thickening; whereas others are more reserved in their opinions. The importance of early recognition of pulmonary tuberculosis is thoroughly understood, and roentgenologists are to be commended for their efforts to establish a diagnosis in the earliest stage possible; but it would seem that a better understanding should exist between the internist and the roentgenologist, the latter reporting his findings to the former not as conclusive but as substantiating or contradicting the clinical data.

Stereoscopic pictures are becoming deservedly popular, but the attitude of extremists who specialize in that field is oftentimes ridiculous. Anyone familiar with *x*-ray interpretation can read a flat plate. However, there are some who, owing to unilateral visual defect, cannot read a stereoscopic set. It is perfectly true that while the stereoscopic-roentgenologist may be able to see more by his method, his ability to read a flat plate is limited only by his knowledge of *x*-ray interpretation.

Where stereoscopic pictures are taken "up and down" and laterally, it is to my mind just as essential to make a flat plate against which to check the stereoscopic readings, in that way overcoming the tendency of seeing too much in the stereoscopic pictures. Dr. Chamberlain, of New York, as a routine measure takes two stereoscopic sets and a flat plate, and then checks the one against the other.

In my opinion there is an undoubted advantage in stereoscopic pictures of the head, chest and pelvis, also in the localization of foreign substances, especially in joints; but under other circumstances they constitute a nicety rather than a necessity.

In the treatment of malignant disease the surgeon and the radio-therapeutist seem to be striving to supplant each other. The only feature upon which all are agreed is that we are sadly in need of a cure for cancer. How much better it would be if the limitations of each could be definitely established, and each assume his legitimate part in the treatment. The attitude of the surgeon has never seemed quite fair, but this may be due in part at least to the extravagant claims made by certain radiotherapeutists.

In the therapeutics of malignant disease both by the *x*-ray and by radium, great advancing strides have occurred through the perfecting of *x*-ray machines and *x*-ray tubes, and a more intelligent understanding concerning the application of radium. The action of the *x*-ray and radium on the tissues is almost identical. In both we have the *Alpha, Beta* and *Gamma* rays, the two former being "screened out" for deep therapy. In applying either radium or the *x*-ray we screen with the same object, i. e., to permit the use of the soft rays for superficial lesions, and the hard or penetrating (Gamma) rays for deeper structures. However, the method of application necessarily differs. There are anatomic situations where radium is preferable because of accessibility rather than the production of any different action by the rays. In the case of an isolated neoplasm radium emanation tubes might be inserted into the mass which could thus be radiated from all angles. This is ideal but impractical, because there are few places in this country where emanation tubes are obtainable and the cost of radium is such that a sufficient quantity is beyond the means of the most of us. An *x*-ray machine with a nine inch spark-gap may be had in every city, and if cross-fire treatment be intelligently applied equally satisfactory results may be anticipated, excepting in anatomic situations which can be directly reached by radium and are inaccessible to the *x*-ray. Where large areas are to be treated, the *x*-ray is much to be preferred on account of the shortness of time in giving the dose.

The greatest trouble between the surgeon and the radio-therapeutist is due to the fact that each has seen the failures of the other. For instance, an individual with neglected mammary carcinoma will go to the surgeon who operates and then refers the patient to the therapeutist; the latter, with the idea of ascertaining the extent of the disease, will make a roentgenoscopic examination and find mediastinal gland involvement, which may have been present at the time of the operation for all he or the surgeon knows. On the other hand, how many patients suffering from malignancy have reached the surgeon after months of futile treatment by the radiotherapeutist, when the disease might have been eradicated by surgery undertaken in time.

It is generally conceded that benefit accrues from radiation of operable malignant lesions prior to operation, especial attention being devoted to points of possible metastasis. The after-radiation has been so generally adopted that it need not be mentioned, excepting to emphasize the fact that unless radiation be practiced with thoroughness and all points of metastasis rayed, instead of doing good the treatment may act as a stimulant to any remaining pathology.

In the treatment of lesions involving the female generative tract, particularly the cervix and uterus, there exists considerable divergence of opinion between the *x*-ray therapeutist and the one using radium, the radium exponent claiming superiority owing to the more direct action of the rays by the insertion of radium into the uterus. The question of rendering the patient sterile should not be overlooked in the choice of the agent to be employed. To produce enough rays through the uterus by radium, there must necessarily be caused a change in the uterine membranes with consequent impairment of generative function. Therefore, in patients before supervention of the menopause I should first consider the *x*-ray; during or after the menopause either the *x*-ray or radium may be used, or a combination of both may be preferable. There are cases where neither will cause cessation of the discharge, pain, or reduction of the tumor, but when used together the desired result may be obtained.

The question as to the dividing line where a lesion should be considered surgical or be subjected to radiotherapy is a most perplexing one, and it is to be hoped greater knowledge concerning application of the Gamma rays will later solve this for the radio-therapeutist. It would certainly seem to me that the surgeon, who has had complete charge of such cases for years, should have something to say about the treatment; and it is necessary for the therapeutist to prove his ability to cope with them, as well as recognizing defeat in some instances, before he can expect the whole-hearted support of the surgeon. We know radiotherapy will reduce the size of a fibroid tumor; it is also true in some cases that much benefit is obtained by alleviating the distressing symptoms without apparent change in size of the tumor; or the tumor may be reduced in size but still be palpable. The determination of when surgical intervention should be instituted in such cases would certainly foster a better understanding between the surgeon and the therapeutist.

In the treatment of exophthalmic goiter technics have been perfected to such an extent that all surgeons realize the importance of the *x*-ray and radium, and the only feature the therapeutist has to guard against is attempting to do too much. There are cases which do not react kindly to the rays, and I have found that changing to massive treatment, or to fractional doses, will frequently produce the desired result. When several technics have been utilized and no benefit has accrued, the therapeutist should recognize defeat in that particular case and return the patient to the surgeon or the internist.

In the treatment of skin diseases the *x*-ray and radium play an important rôle, and the only dermatologists I know today who do not recognize this fact are those who are unfamiliar with the proper use of these agents. It does not seem entirely safe, however, for anyone operating an *x*-ray machine or having radium in his possession, to assume the management of skin diseases; the treatment should be administered by the dermatologist, or under his direct supervision, and the results obtained be carefully noted by him. In applying massive doses the one employing them should be familiar with the course of the particular lesion being treated as well as any reaction resulting from the use of the rays; and in fractional doses should have a thorough knowledge of the cumulative effect of *x*-ray and radium radiations. If these features are not understood and remembered, and records of the dosage kept, the most experienced radiotherapeutist may cause serious damage to the skin.

In regard to the question of preferability of radium or the *x*-ray in the treatment of skin lesions; I have obtained better results in the treatment of keloids, lupus erythematosis, nevus-vasculosis, and nevus-cavernosum, with radium than with the *x*-ray. I have treated one hundred and fifty-six skin epitheliomata with the *x*-ray, and between twenty-five and thirty with radium, by massive dose radiation. The question of choice of technic in the treatment of skin epithelioma will not be considered, other than to say the only man who is employing fractional doses with exceptionally good effect is Dr. W. A. Pusey; and his favorable results are considered due to his wide experience and skill in handling the *x*-ray. The majority of operators are employing the intensive treatment, and most of those who have changed from fractional to intensive report a more favorable outcome from the latter method of procedure.

My results have not led me to give either the *x*-ray or radium any decided preference. Where the lesion is too large to be covered by one application of radium, the fear of overlapping is obviated by *x*-ray treatment and an absolutely even radiation thus assured. There are, of course, some lesions involving the buccal cavity and throat where radium may be directly applied, and in such cases radium is naturally superior to the *x*-ray.

In skin lesions where the involved areas are large and numerous, fractional doses with the *x*-ray are considered more beneficial; moreover, the use of radium would be impossible because of the time which would be required for treatment. In psoriasis, eczema and lichen planus, where the lesions are quite generally distributed, the *x*-ray in fractional doses is preferred. One would hardly attempt to treat such cases with radium as the time required would make this impracticable, and good ultimate results may be secured, and usually there is almost immediate relief from itching, especially in lichen planus, by application of the *x*-ray.

The question of causing telangiectasis, *x*-ray dermatitis or *x*-ray burns, is a most vital one to the radio-therapeutist. The seriousness of producing any of these conditions, and especially the latter two, is too constantly borne in mind by anyone employing the rays. A careless departure from recognized technic may be the cause of untold misery and suffering on the part of the patient, as well as the realization of error and a constant reminder to the therapeutist. We may talk of an idiosyncrasy of individuals to radiation, but such instances are very few and far between. The great fear of the student of radio-therapeutics is not that his efforts will be discredited, but there will always be certain workers in this field who will attempt to do too much without being able to recognize the limitations of radiation as we understand them today.

There is nothing original in this contribution and no attempt has been made to dictate any policy, the various phases of the subject being merely touched upon lightly. The sole object is to state facts as I see them with the hope that a better understanding may be forthcoming between the roentgenologist, the radio-therapeutist and those working in other branches of the profession. There is room for all of us in the medical profession, and the roentgenologist and the radio-therapeutist have attained an important position. It is to be hoped that each branch of medical science will maintain its place and incidentally not encroach upon the legitimate domain of others.

Letter to the Editor

MEDICO-LITERARY MISAPPLICATIONS AND AMBIGUITIES.

New York City, August 25, 1919.

The article on this subject by C. C. Mapes, in the August, 1919, issue of THE AMERICAN JOURNAL OF SURGERY is both interesting and valuable as a pointed argument for the use of more correct terminology in medical literature.

There are several instances, however, to which I believe exception may be taken.

The Greek prefix *gono* truly enough means *seed,* but this is neither its most common meaning nor its only one. Its two most common uses are "offspring" and "parts of generation." It is very likely that in the word gonorrhea the meaning intended was a flowing from the organs of generation. So there is a rather clear indication of the origin of the flow and of its point of emergence.

The term *Neisserian urethrorrhea* falls short in about the same way, inasmuch as though it indicates the causative by the prefixed "Neisserian" and the point of emergence, it ignores a clear expression of the origin of the flow.

Granting that we are applying the term *gonorrhea* or the term *Neisserian urethrorrhea* to the disease in question, what is there incorrect in using either of these terms adjectively to indicate the nature of a complication as endocarditis. This is parallel to the use of such adjectives as *naval* in the expression *naval hospital,* and *animal* in *animal hospital.*

The common Greek word for seed (semen) is *sperma,* from which is derived our word *spermatorrhea.*

One of the most misused words in our medical terminology is *catarrh.* This is derived from the Greek words *kata*—away from, down from, and *rheo*—to flow. It has come to mean, at least, in common parlance, any chronic inflammation of the nasal tract, accompanied by a discharge.

Except in special instances where there is obvious objection it would seem that words fully expressive could be derived from the combination of the word *rheo*—to flow, with prefixes showing the source of the flow—urethra, etc., supplemented by adjectives showing the causative such as Neisserian, etc.

It would be highly gratifying if we might have a Board of Medical Terminology, actively functioning in this field, much as the National Board on Geographical Names serves in that connection and several other instances in kindred fields of endeavor.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

New York, September, 1919

THE INTERPRETATION OF ROENTGENOGRAMS.

One of the most valuable diagnostic possessions that the surgeon can—and should—acquire is the ability to interpret *x*-ray plates; to distinguish between an artifact and the tracing of a real lesion, between the shadow of a phlebolith or calcified lymph-node and that of a calculus, between an ununited epiphysis and a fracture; to recognize in roentgenograms of the gastro-intestinal tract the physiological, the functional and the grossly pathologic; in chest pictures the lung cavity, the abscess, the effusion, pneumothorax, thickened pleura; and, above all, to differentiate by the peculiarities of their finer traceries on the plate the various inflammatory, neoplastic and traumatic diseases of the bones and joints: tuberculosis, syphilis, pyogenic infections, and the many varieties of bone tumors.

A gumma of the bone may resemble in the roentgenogram a sarcoma, and if the distinction is not made by carefully studying the details of the plate an unnecessary amputation may be performed. The recognition of an osteal carcinoma, scarcely possible by one not a good student of roentgenograms, clearly indicates a search for a primary lesion elsewhere as would also, for example, the tracing of a sarcoma of the lung. To distinguish in the shadows the periostitis of pyogenic infection from that of syphilis, spina ventosa from luetic dactylitis, is clearly very important, yet not by any means easy. We need not multiply instances to emphasize the argument.

The surgeon who is unable to differentiate *x*-ray appearances is handicapped in that he is dependent upon the interpretation of the roentgenographer who may be both experienced and astute and may be neither.

The best means of learning roentgenographic interpretation is, of course, by close observation of many plates, balancing their appearances against clinical, including operative and bacterial, findings. This may well be supplemented by reference to *x*-ray atlases, as, for example, that of Grashey. As a guide however, that will help much to avoid errors, a reliable manual of differential *x*-ray diagnosis is also desirable, especially for the novitiate. We have, in fact, been led to write this by the recent appearance of an excellent manual* of this sort in which the most important data are presented so clearly and succinctly that we feel impelled to call attention to its merits. We commend its study to those who appreciate the wisdom of learning for themselves the diagnostics of the *x*-ray plate.

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* Roentgen Interpretation. By George W. Holmes, M.D., and Howard E. Ruggles, M.D. Lea and Febiger, 1919.

SURGICAL AND PULMONARY TUBERCULOSIS IN THE UNITED STATES.

There are no statistics available by which we can determine the morbidity and mortality of surgical tuberculosis in the United States, but knowing that tuberculosis of the tissues other than the lungs is common in surgical practice, we may approach some rough estimate of its extent by contemplating the known incidence of tuberculosis in general, and the official figures for pulmonary tuberculosis.

Tuberculosis causes annually one hundred and fifty thousand deaths in the United States. Estimating from the figures of the United States Census Bureau for 1916, fully six per cent. of these deaths were from surgical tuberculosis, and probably the percentage is considerably higher. During the examination of men for the National Army sixty-nine thousand were rejected by the Draft Boards on account of tuberculosis and twenty-two thousand more were rejected for the same reason on arrival at camps, We have not the figures for tuberculosis in the American Army during the year 1918 but in 1917 nearly four per cent. of the deaths among the enlisted men were caused by tuberculosis and thirty-one and a half per cent. of the discharges from the Army in the same year were on account of tuberculosis. It is safe to estimate that ten thousand American soldiers developed tuberculosis during the war.

These figures startlingly indicate the extent of tuberculosis in this country and demonstrate the need for continuing an active campaign to combat the menace. The National Tuberculosis Association is planning a drive during the next few months which should enlist the intelligent support and assistance of the entire profession in which, as the above data indicate, the surgeon should play no inconspicuous rôle.

AN INFORMATION SERVICE FOR VISITING PHYSICIANS.

New York City is unsurpassed in the number and variety of its surgical clinics. To direct physicians to the hospitals where they can see the surgeons and the surgical work they are interested in the Journal maintains in its publication office a Clinic Information Bureau which is at the service of all visitors.

The Surgeons of Greater New York are invited to send to the Journal office information concerning their clinics and operating schedules that will be of interest to visiting physicians.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

NEGROES IN PROFESSIONAL SERVICE.

The Negro population of the United States is so large that it merits careful study, not merely from the standpoint of industry, but also that of public health. The total number of the negro population in 1910 at the age of ten years and over was 7,317,922, of which 87.6 per cent. were distributed throughout the southern sections of the United States. One naturally inquires as to what percentage of negroes are engaged in professional pursuits. In 1910, there was one negro in professional service to every 146 of the negro population, as compared with one to 51 among the whites. This disparity is by no means as marked as becomes evident in considering those giving professional service along lines distinctively related to public health. For example, there was one negro dentist to every 20,560 negroes, where there was one white dentist for every 2,070 of the white population. Of physicians and surgeons there was one negro to every 3,194, and one white physician and surgeon to every 553 of the white population. Trained negro nurses were one to every 4,039, while there was one white trained nurse to every 1,024 of the white population. The ratios for veterinary surgeons was one to every 80,555 for negroes, and one to 7,292 for the whites.

One is wont to think that semi-professional exploiters such as fortune tellers, hypnotists, spiritualists are far more numerous among the colored than the white populations, but as a matter of record in 1910 there was one of this group to every 98,278 negroes, and one to every 55,150 among the whites. Even the alleged healers were more numerous among the whites, where they were in proportion of one to 12,715 of the population as compared with one negro healer to every 29,602 of the colored population.

Fortunately, there is a marked increase in the development of professional classes among the negroes, as is evidenced by the increase of negro physicians and surgeons from 909 in 1890, to 3,409 in 1910, while the dentists have grown from 120 to 478 during the same period of time. This growth in professional service may be largely attributable to the developments in education. The number of colored teachers and professors in colleges has grown from 15,100 in 1890 to 29,772 in 1910, while the respective ratio in 1910 was one negro teacher to every 333 of the population as compared with one white teacher to every 144 of the white population.

The standards of education, however, cannot be determined on a numerical basis, but there is much more to be learned from the percentage of school attendance of negroes, which increased for negroes between the age of five and twenty years, from 31 per cent. in 1900 to 44.7 per cent. in 1910, though this is in sharp contrast with the corresponding figures for whites of the same age, 53.6 per cent. in 1900, and 63.1 per cent. in 1910. This marked increase in school attendance on the part of the negroes tends to raise the individual educational standards and goes far to making possible the attainment in education of sufficient fundamental material to facilitate professional training.

Illiteracy has markedly decreased among negroes, falling from 571 per thousand population of ten years of age and over in 1890 to 304 in 1910. As is properly stated in the excellent volume on the Negro Population recently issued by the *Bureau of the Census,* "The persons who were 15 to 24 years of age in 1890, for example, so far as they were still living at succeeding censuses, were 25 to 34 years of age in 1900 and 35 to 44 in 1910. The percentage illiterate for this group of individuals decreased from 45.7 in 1890 to 39.3 in 1900, and to 32.3 in 1910." The general illiteracy among negroes ten years of age and over has fallen from 57.1 per cent. in 1890 to 30.4 per cent. in 1910. When this is compared with the illiteracy percentages of the whites, native born 3 per cent. and foreign born white 12.7 per cent. in 1910, one recognizes the great need for giving more attention to the educational opportunities for negroes.

The vast growth of the professional classes among the negroes is of pronounced importance in working out the health problems of this imposing group of our national population. Leaving aside the large proportion of negroes in the dispensary population, it must be patent that there is at present an inadequate supply of negro physicians to meet the legitimate demand of this part of the population, for which few special efforts have been made along the line of organized medical aid. To lighten the burdens from sickness and accident, it is essential that every effort be made to develop a larger proportion of trained physicians from among the negroes in those sections of the country where their percentage in the population is large. The fundamental machinery involves the educational system. A policy which suppresses the development of any large group of the community is contrary to public policy and opposed to the interests of the country as a whole.

War has undoubtedly changed in large part the mental attitude of many thousands of negroes who responded to the call for national service, and are in turn seeking justice at the hands of their country. Democracy is most attainable through education; and equality of educational opportunity is at its very foundation. Medical institutions might well take cognizance of their duties and obligations in this emergency. Hospitals, dispensaries, and public health agencies employing physicians should give particular attention to the part they must play in granting justice and freedom of education to the negro whose ambition spurs him to take up a professional life. The importance of the changing educational standards from the elementary school system through normal schools and colleges is only an indication of the alterations which must develop in the higher institutions of learning among which medical colleges must be classed. Whether there be segregation or not, the responsibility for providing a capable teaching staff, of affording ample opportunity for hospital experience, followed up by a supervised clinical experience, remains.

Medicine recognizes, or should recognize, no color line. Surgery certainly is no different insofar as technic is concerned, despite the moderate variations in the frequency of pathological conditions among the whites and the negroes. If the negro physician and surgeon is not given an opportunity to attain his potential development the mass of negroes will receive inadequate medical attention and public health progress will be unnecessarily retarded.

Progress in Surgery

A Résumé of Recent Literature.

The Value of Solid Paraffin Wax in Facial Surgery.

Spencer Mort, Glasgow. *The Lancet*, July 19, 1919.

Mort, after using all kinds of materials in facial surgery, has come to the conclusion that solid wax is the best material to use as a permanent subcutaneous splint. Melted wax usually gives great trouble; it often solidifies in the needle; it cannot be introduced smoothly, because it comes out of the syringe in spurts and then solidifies in lumps. Mort uses cold wax, pure hard paraffin with a melting point of 110° to 115° F.

The wax is broken off into small pieces, then shaped into little splints about ¼ x ¼ x ½ inch. These are introduced under scars or wherever desired through a small incision, which is then closed over.

Ankylosis of the Jaw Due to Fixation of the Temporal Muscle: Method of Treatment.

Gordon B. New, Rochester, Minn. *Journal of the American Medical Association*, July 26, 1919.

The types of jaw ankylosis are three, according to New; the articular, involving only the bony joint, is the most common and is comparatively easy to relieve, the results of operation being uniformly good. It consists of an arthroplasty of the temporomaxillary joint through a curved incision, two inches long, from above the zygoma and down in front of the ear, and the removal of at least one-half of the condyle and the ascending ramus of the jaw. It is not necessary to interpose any tissue in the new joint, and, if this is normal, the operation is not difficult. If the typical deformity of ankylosis began early in life, the joint will be very low, and should be attacked from above, by removing the lower margin of the zygoma, thus avoiding the facial nerve. Treatment of the extra-articular form, and that in which both muscles and joint are involved, is much more difficult and presents many problems. New reports a recent case of extra-articular ankylosis relieved by an operation, which, as far as he knows, is original. The cause of the ankylosis was an operation several years before on the Gasserian ganglion, which was successful so far as the neuralgia was concerned, but left the joint with ankylosis by fixation of the temporal muscle. Stretching failed to help; so the following operation was performed: "A mastoid retractor was inserted and the zygoma exposed well forward. In elevating the soft tissues over the zygoma, it is essential to keep close to the bone, thus preventing injury to the facial nerve. By means of blunt dissecting scissors and a periosteal elevator the inner surface of the zygoma was freed so a piece of it one inch long was removed with a Gigli saw. This piece was placed in a warm wet gauze sponge. The temporal muscle and coronoid process were then exposed and removed with a curved chisel and bone-biting forceps. The attachment of the temporal muscle to the inner surface and notch of the ascending ramus was removed by blunt dissecting scissors. The temporomaxillary joint was exposed but not opened, and was found to be normal." The piece of the zygoma was replaced and secured by catgut and dermal sutures. Next day the patient could open his mouth and, in a week, separate his jaws an inch and was able to chew. The function has now been restored for four months.

Thoracic Fistula and Chronic Empyema. Howard Lilienthal, New York. *Annals of Surgery,* July, 1919.

Lilienthal describes in detail his method of exposure of the chest cavity, and operations for chronic empyemas and sinuses. He has followed this procedure in war wounds of the chest cavity, with excellent results. The main advantages of his operation are the excellent exposure of the thoracic cavity, allowing thorough inspection of the thorax, and the fact that it leaves a linear scar, in contrast to the deforming conditions present after chest-collapsing operations like the Schede, Estlander, Wileus or Delorme operations.

The anesthesia is preferably intra-pharyngeal, especially in recent cases; with foot-bellows or pump attachment to regulate the intra-pulmonary pressure. The incision is a long linear one in the sixth or seventh space, close to the upper border of the rib, and exposure of the cavity is secured by means of powerful rib retractors. When the lung is found retracted and fixed, covered by a dense membrane, the membrane should be incised vertically, and dissected off bluntly as far as possible. Intrapulmonary pressure is now applied by the anesthetist and the extent of mobilization of the lung determined. Superficial tears of the surface of the lung should not cause any alarm. As a rule, adhesions between the chest wall and the lung should not be disturbed. The wound is closed in layers with tube drainage. After-treatment should consist in cautious irrigations of Dakin's solution, when it is certain that no bronchial fistula is present.

Cases suitable for this type of operations are:

1. Cavities and sinuses persisting for more than two months.
2. Those with large rigid cavities and profuse discharge.
3. Cases with small cavities which have resisted other forms of treatment.

The Treatment of Chest Injuries. Marion A. Blankenhorn, Cleveland. *Journal of the American Medical Association,* July 26, 1919.

The treatment of chest injuries at the beginning of the great war was very unsatisfactory but was much improved toward the end, both in technic and scope. Methods of examination of a wounded chest are precise; the damage can be estimated, and the treatment indicated. Foreign bodies usually follow a definite course, and, if lodged, can be located by the roentgen ray. With proper appliances, the trained surgeon can invade the thorax to remove infection and make repairs. The effect of infecting organisms is still the greatest unknown quantity. His paper is based on the experience of various British and American surgeons in handling approximately 500 cases. The chest wounds in the forward area hospitals fall into five main groups, according to their severity and the urgency of treatment: (1) open pneumothorax; (2) extensive parietal wounds, involving ribs and muscles; (3) large, retained foreign bodies; (4) infected hemothorax, and, (5) simple hemothorax. There is no spontaneous cure for open pneumothorax or the sucking wound. Immediate anatomic repair is indicated and affords almost instant relief. If untreated, the patient rapidly failed, and died, apparently from asphyxia. Simple stopping of the wound with a plug of gauze would revive a man in a few hours, sufficiently to enable him to undergo an extensive operation and exposure of his wound. Parietal wounds, penetrating or not, demand the same consideration as other wounds, with the additional reason that infection may be induced by the broken bones, or that these may injure the heart and pericardium. Parietal wounds of less extent are a continuous source of infection to an adjacent hemothorax. If they connect with the pleural space by ever so small a sinus, they cannot be drained. It was found advisable to convert a parietal wound into an open pneumothorax if necessary to make a thorough revision and good closure. Opening the chest freely was found easy and safe; the procedure was well tolerated and caused very little shock. A good nitrous oxid machine and a skilled anesthetist are necessary. Retained foreign bodies are dangerous as a source of infection and mechanical erosion of large vessels. Undeformed bullets and shrapnel balls are strikingly harmless, but shell fragments are usually wrapt around with clothing and dirt, and, if they are as large as an inch in diameter, are almost never tolerated. They must be removed as soon as possible to prevent abscess or empyema. If large, the man is usually unfit for immediate operation on account of hemorrhage, shock or both; and if the first persists in spite of treatment, he will probably never be fit for operation. Transfusion or infusion only increased the hemothorax, and the patient died suddenly with angina. The pressure and volume of fluid in the chest apparently crowded the lung and heart out of action. Rest in a warm bed with plenty of fluids and morphin, however, usually brought the patients to a fit condition for the operation required for the removal of the foreign body. Frequently, the rib resection should be made sufficient to admit the hand to the thoracic cavity in order to explore it fully. The fourth and fifth ribs in the axillary space are best for this purpose. If the foreign body was removed through healthy pleura, it had to be sutured, if through carnified lung, hemostasis or closure was not usually needed. How much should be done for carnified lung was a question, and Blankenhorn thinks that beyond removing gross contamination and necrotic tissue, the less done the better. The tolerance of the operation by the patients was remarked on. It was thought by many that the lung should be kept collapsed and at rest after the injury, but the removal of collections of air or fluid from the pleural cavity introduced a new problem. Infection of the pleural sinus was the greatest foe to the man who survived his anatomic injury, but it was surprising how the pleural membranes combated infection when in their natural position and condition, and hence the accumulations of air or fluid should be prevented as far as possible. After the operation and the closure, serous exudates appeared, and, sometimes, repeated aspiration was needed. In other cases, the fluid kept accumulating and finally became purulent, causing a small empyema at the base of the chest, but drainage was easy. The infected and the uninfected hemothorax were at first confused and managed alike. The degree of contamination and amount of free fluid are the principal determining factors—each case must be managed by itself. Many patients, in cases in which there was no infection, did well without interference, but in infected cases, as a rule, free drainage was needed. If it could be delayed by repeated tapping, the results were generally good. Some cases require drainage at once. In cases with drainage, the management was much the same as in civil surgery, except in some instances in which empyema cavities were treated by the Carrel-Dakin method with good results.

A Case of Perforated Gastric Ulcer, with Abscess Formation; Perforation through the Lung, with Spontaneous Recovery. Julius Friedenwald, Baltimore. *American Journal of Medical Sciences,* August, 1919.

The patient was aged 51 years and had a history of gastric ulcer dating back twenty-five years. After some weeks of exaggerated symptoms, he was suddenly seized with severe agonizing pains over the left upper abdomen; the abdomen was distended and the epigastric area was tender. The following day, pain was present in the left hypochondrium; this persisted for ten days, accompanied by temperature ranging between 101 and 103 degrees. He developed a cough and hiccoughing, which were followed shortly by a purulent expectoration. He expectorated during the first day about a quart of pus. When the expectoration began, the temperature receded, and the pain became greatly diminished. After admission to the hospital, he continued to expectorate pus in decreasing amounts, and finally went on to complete recovery. Roentgenography showed a defect at the pyloroduodenal junction, revealing an ulcer at this area. The patient had a gastric ulcer, which perforated. This was followed by the formation of a sub-phrenic abscess, and finally a perforation through the lung, with expectoration of pus.

Roentgen Examination of the Abdominal Organs Following Oxygen inflation of the Peritoneal Cavity.

Arthur Stein and William H. Stewart, New York. *Annals of Surgery*, July, 1919.

The authors review the history of oxygen-inflation of the peritoneal cavity, preparatory to *x*-ray examination, and present their own simplified technic. Three to four liters of oxygen are introduced. The apparatus is an ordinary gas bag as used with the Bennet inhaler, connected by a tube to the introducing needle. The point of selection is about two to three finger breadths to the left of the umbilicus and about one and a half inches below it. The patient lies on his back. The needle is pushed through till it touches the fascia. After a short stop, it is pushed further through the fascia, muscle and peritoneum without any difficulty. Slight pressure on the bag will now inflate the abdominal cavity. Three to four liters are injected. The procedure is apparently perfectly safe and no ill-effects have been encountered.

The pictures are taken two to three hours after inflation. *X*-ray pictures taken in this manner show beautifully the parenchymatous organs, liver, spleen, kidney and diaphragm. Their clarity is astonishing. The authors present several beautiful demonstrations. Pathological conditions such as carcinomatosis, cirrhosis of the liver, enlargement of the spleen, and tumors of the stomach, intestines and ovaries are easily demonstrated. The authors were also able to demonstrate the normal uterus with its round ligaments, small cystic ovaries, normal bladder, normal gall-bladder, normal spleen with its outstanding pedicles, and both kidneys. They believe this to be a method of great diagnostic value.

The authors make no mention of the danger of puncturing adherent intestine, if such adhesion happen to present at the site of puncture.

Abdominal Surgery Under Local Anesthesia.

Robert E. Farr, Minneapolis. *Journal of the American Medical Association*, August 9, 1919.

Farr advocates local anesthesia in abdominal surgery. Its advantages are, first, its greater safety and, second, the better management for the avoidance of hemorrhage made possible by the use of epinephrin, and the possibility of doing more deliberate work. The dangers from sepsis probably differ very slightly in the two methods, but the opportunity for giving more attention to detail and the undisturbed condition of the viscera probably give local anesthesia some technical advantage. The struggles of the patient and the danger of rupturing an abscess, thus spreading infection, difficulties present under general anesthesia, are better avoided, as well as some post-operative conditions, such as vomiting. One of the greatest advances of surgical technic of the last two decades has been the realization that the tissues should be as little traumatized as possible, and to local anesthesia and to those who have employed it must go much of the credit for this advance. With local anesthesia, resulting in a negative intra-abdominal pressure, and the viscera retracting instead of extruding from the abdominal wound, better opportunities for inspection are afforded in many ordinary operations. It is true the viscera may not be displaced and handled as readily, distant digital exploratory operations may be more difficult, and adherent masses are not so easily dealth with. In the proper class of cases for local anesthesia, however, visual examination has advantages equal to those of digital exploration. The element of time, which has been the basis of an objection, Farr thinks, needs little consideration. Other things being equal, the more deliberately an operation can be performed, the better. With the less amount of hemorrhage and trauma in the local method, shock is less liable to occur, and the subsequent condition of the patient is consequently better. The absence of thirst, nausea and vomiting, and the low percentage of gas pains, which occur proportionately to the amount of handling of the viscera, are other factors. The percentage of abdominal operations that can be successfully performed under local anesthesia will depend largely on the experience of the operator. In Farr's experience, abdominal operations can be performed on children under local anesthesia with even greater facility than under general anesthesia.

As regards technic, the agent of choice is procain, 0.5 per cent., in Ringer's solution, combined with epinephrin, five drops to the ounce. Excepting in hernia cases, he prefers direct infiltration of the abdominal wall rather than conduction anesthesia. All layers are infiltrated before the incision is made, and if supplementary injection is needed, he considers it an indication of faulty technic. Minute attention is given to details, and equable distribution of the injections. "The ideal aimed at is to deposit the fluid equably throughout the desired area without any sensation of pain on the part of the patient after the first needle prick, which is made for the production of the initial intradermal wheal. All subsequent wheals are made from beneath. . . ., and the intradermal wheal is repeated only for the purpose of secondary introductions of the infiltrating needle as the field is traversed. Aside from the wheal points, the skin is anesthetized by a subdermal infiltration. A 4-inch Record needle, No. 23, is used. Through this a wall of infiltration is built beneath the proposed line of incision, with a base from a 2 to 3 inches in width, the apex being the line of incision through the skin." Five years ago he discarded the syringe, and now uses the pneumatic injector for this work. With this, the ordinary abdominal wall can be anesthetized in from two to three minutes, and the incision made at once. A number of special points in operating on different organs and under different conditions are noticed, and Farr makes the positive statement that all plastic surgery on the abdominal wall, with or without adhesions falls readily in the ideal class for local anesthesia. It should no longer be confined to minor surgery, and to the cases in which the patient cannot, apparently, take a general anesthetic. With proper equipment and technic, a large proportion of major surgery can be performed under this method, with greater safety, less trauma, and less post-operative discomfort, than when general anesthesia is employed; and the operation can be performed more completely.

Disappointments after Gastro-Enterostomy.

Sir Berkely Moynihan, Leeds. *The British Medical Journal*, July 12, 1919.

While the operation of gastro-enterostomy is one of the most successful procedures in surgery, the numerous disappointments following it leads Moynihan to study the causes of failure. He tabulates the failures in the following manner:

A. The operation has been performed in the absence of any organic lesion justifying it.

There are two types of such cases: first, the functional disorders of the stomach, not associated with organic lesions, and secondly, cases of mistaken diagnosis, in which there was chronic disease elsewhere. Moynihan has seen gastro-enterostomy performed for the following conditions: chronic appendicitis, tuberculosis of the intestine, cholelithiasis, cirrhosis of the liver with gastric hemorrhages, splenic anemia, tabes dorsalis (gastric crisis), multiple sclerosis, toxemia of pregnancy, lead poisoning, prolapse of kidney, colonic adhesions, epigastric hernia.

B. The operation has been incomplete. Many cases of gastric and duodenal ulcers, have gastro-enterostomy performed, while the ulcer itself is left untreated. The local disease should be removed as far as possible, or infolded, and associated conditions like chronic appendicitis and cholelithiosis attended to.

C. There were defects in technique of the operation. These are as follows:

1. A long jejunal loop has been left, instead of a short one.
2. The efferent loop has become adherent.
3. The jejunun has been rotated around its long axis and twisted.
4. The opening is too small.
5. The opening is badly placed. The opening should

always reach the greater curvature; preferably in direct line with the esophagus.

6. The rent in the mesocolon has not been closed. This may cause internal hernia.
7. Unabsorbable sutures have been used. These often cause late hemorrhages.
8. There was an imperfect closure of the abdominal wall.

D. Late complications may develop after an operation, performed in a case requiring it, without any technical flaw. These are jejunal ulcer, carcinomatous change in a gastric ulcer.

The main symptoms after unsuccessful gastro-enterostomy are pain, vomiting, hemorrhage, diarrhea.

Pain may be due to revival of activity in an unhealed ulcer, the presence of a jejunal ulcer, adhesions, the presence of another disease which has been overlooked.

Hemorrhage may be due to the separation of a suture, continued activity in an ulcer, a jejunal ulcer, the presence of some other disease as splenic anemia, cirrhosis of the liver, etc.

Vomiting may be due to obstruction due to any of the technical defects of the operation, and to functional causes. Diarrhea may be due to too rapid emptying of the stomach, some other pathological condition of the intestine, the offensive character of the escaping stomach contents.

Trendelenburg Anesthesia in Surgery of the Pelvis. Donald Guthrie, Sayre, Pa. *Journal of the American Medical Association,* August 9, 1919.

Guthrie advocates the Trendelenburg position in anesthesia to avoid injury of the small intestine, and to avoid ileus and shock. It may be asked why the anesthesia administration may not be begun in the dorsal position, and the patient changed after she begns to come under its influence. He has tried this but finds it less satisfactory. The patient does not yield to suggestions and is likely to begin straining and coughing, which are fatal to the success of the method, if the position is changed. To wait until she is fully anesthetized does not give the diaphragm time to pull the small intestine out of the pelvis. He describes the method as follows: "The anesthetist, who has previously met the patient, accompanies her to the operating room, feeding her mind with well chosen suggestions. The patient steps on a stool and sits on the table, the foot part of which has been lowered. The legs are fastened to the foot of the table by a broad surcingle which is fitted snugly, but not made uncomfortably tight. . . . The patient then lies down on the table with her hands clasped and her arms folded across her chest. The arms are fastened by a gauze bandage, which is attached to the head of the table. The table is now lowered in the high Trendelenburg position and the anesthesia begun. . . . Absolute quiet is maintained in the operating room while the anesthetic is given. The patient's attention is left entirely with the anesthetist." Comparing this method with the one usually employed, he says it is amazing to see the difference in the gauze packing necessary to be used to obtain exposure. The article is illustrated.

Uterine Hemorrhage. Arnold Sturmdorf, New York. *New York Medical Journal,* July 19, 1919.

In this article, Sturmdorf calls attention to a type of hemorrhage called "functional metrorrhagia which is characterized by a flow of incoagulable blood from the uterus. This condition must be differentiated from those in which blood clots are expelled. The latter are nearly always due to surgical lesions, while the former are all amenable to cure by local and systemic medication.

The identity of this condition is based upon conclusions reached by the author in his studies on uterine hemorrhage. These conclusions are as follows:

1. The general circulating blood, during the menstrual period and in the hemorrhagic conditions here considered, shows normal coagulative properties.

2. During menstruation and such hemorrhage, the endometrium receives the normally coagulable blood from the general circulation and gives vent to this blood in a noncoagulable state.

3. The noncoagulability of the menstrual and hemorrhagic blood discloses an identity in experimental and clinical manifestations, differing only in degree.

4. Under the given conditions the endometrium exercises a function capable of rendering coagulable blood noncoagulable.

5. This function, normal to menstruation, is due to an inhibiting substance, generated in the endometrium. The secretion of this substance is activated by a hormone periodically liberated from the Graafian follicle of the ovary.

6. The noncoagulable blood contains all the essentials to coagulation, nevertheless, this blood does not coagulate and is capable of inhibiting coagulation in normal blood from any source, all of which warrant the assumption that the inhibitive biochemical element, presenting coagulation under normal conditions during menstruation, becoming augmented or protracted by contributory disturbances, presents the direct local causative factor in the production of uterine hemorrhage.

The treatment consists of local intrauterine applications of acetone or 16 per cent. liquor formaldehyde. The cure is effected gradually. In obstinate cases *x*-ray or radium may be tried.

The Distribution of Adenomyomata Containing Uterine Mucosa. Thomas M. Cullen, Baltimore. *American Journal of Obstetrics,* August, 1919.

Cullen reports a series of tumors of various portions of the body, containing uterine mucosa. These adenomyomata consist of a matrix of non-striped muscle and fibrous tissue. Scattered throughout this matrix are isolated groups of glands, sometimes lying in direct contact with the muscle, but usually lying in a characteristic stroma. The glands resemble in every particular, those found in the mucosa lining the body of the uterus. The author describes such adenomyomata occurring in the urterus, round ligaments, utero-ovarian ligaments, uterosacral ligaments, recto-vaginal septum, and umbilicus Occasionally he has found large quantities of uterine mucosa in the normal ovary.

Corpus Luteum Extract in Vomiting of Pregnancy, with Report of Cases. James Knight Quigley, Rochester, N. Y. *American Journal of Obstetrics,* August, 1919.

Quigley presents the summary of cases treated by this method:

Number of cases treated, 17.

Number of cases benefited permanently, 12.

Number of cases benefited but relapsing, 4 (not enough given).

Number of cases of complete failure, 1.

One case of pruritus, no relief.

Average number of doses, 7; had the four relapsing cases been given more at the onset as a routine there would probably have been more cases permanently benefited.

Preparation used, a 1-cc. ampoule containing 0.2 gm. desiccated substance of the gland.

Episeotomy: Its Relation to the Conduct of Labor. Charles G. Child, Jr., New York. *Medical Record,* July 26, 1919.

Child urges the wider application of this operation which seems to be falling into disuse. He advises inspection of the vaginal walls, between labor pains as the head recedes from the vulva, and believes that superficial tears of the mucous membrane are indicative of deeper tears to come. These cases are proper subjects for episeotomy.

The operation of episeotomy consists in enlarging the outlet of the birth canal by an incision made with a knife, or preferably with scissors. The site of the incision is on one side of the vulva, and should go through the skin, subcutaneous and adipose tissue, down to the levator muscle. The division of the muscle should be carried to a point just sufficient to allow the birth of the head. The extent necessary is gauged as the head advances with each pain. The division of the fibers progresses hand in hand with the pressure of the head, until the proper point has been reached. In some primiparæ, in whom the introitus is over-small, or the head over-large, bilateral episeotomy may be necessary. In breech extractions, where plenty of room is so often necessary for the release of extended arms, or to incise a cervix that has contracted around the neck of the after-coming head, no chances should be taken with a small incision.

The suturing of the incision after delivery offers no particular difficulty. Interrupted silkworm-gut sutures are the best, and these should be passed deeply from without inwards, taking up all tissue as far as the vaginal mucosa. This latter is then united by a continuous suture of No. 2 chromic catgut. All sutures can be introduced while waiting for the expulsion of the placenta when the patient is still under the anesthetic, and their introduction is greatly facilitated by the placing of a medium sized laparotomy pad in the vagina to prevent the obstruction of the field of operation by the blood coming from the uterus. These sutures ought not be tied, however, until after the delivery of the placenta in case it should be adherent, making a manual removal necessary.

The Radical Cure of Pelvic Deformity. Henry Jellet, Dublin. *Surgery, Gynecology and Obstetrics*, August, 1919.

In a rather emphatic discussion of pubiotomy, Jellet makes a decided plea for the revival of this operation, not merely for terminating a difficult labor, but in order to permanently cure the condition of contracted pelvis. The author presents the statistics of thirty-five cases. He mentions five principles which he attempts to establish in his paper. These are:

1. Pubiotomy is not merely a method of terminating a difficult labor, it is rather a means of effecting a radical cure of pelvic contraction.
2. Pubiotomy is indicated in both first and second degrees of contracted pelvis.
3. Pubiotomy is not an alternative to Cesarian section any more than is the wiring of a fractured bone an alternative to amputation of the limb.
4. Pubiotomy should never be postponed willingly to the end of the second stage, but should ideally be carried out independently of pregnancy, when its effects are likely to be required.
5. Every effort should be made to prevent union of the bony surfaces. This can be prevented by refraining from the prolonged use of the pubiotomy belt, by allowing patients early movement, and by getting them out of bed as soon as possible.

Pregnancy and Labor Following Amputation of the Cervix Uteri. O. S. Paulik, Chicago. *Surgery, Gynecology and Obstetrics*, August, 1919.

The author reviews the literature to date, from the gynecological and obstetrical standpoint. In women who are approaching the climacteric, there is no question as to the value of the procedure. But there are many objections to the performance of this operation during the child-bearing period. Abortion occurs in about 50 per cent. of cases, and nearly all the others that become pregnant have dystocia. Fortunately, sterility is not uncommon following this operation and the author believes that sterility should be assured when performing it.

Operative Cure of Inguinal Hernia. Franz Torek, New York. *Annals of Surgery*, July, 1919.

Torek reports a modified hernia operation, which he has performed in about six hundred cases, with one-third of one per cent. recurrences. The main features of his operation are based upon the anatomical discovery that a hernial sac protrudes itself in between the spermatic vessels lying above and the vas lying below, at the borders of the internal ring. He believes that the smooth angle formed by the junction of vas and spermatic vessels at the internal ring, invites the formation of hernias and recurrences after operation. The essential point then, in which his operation differs from others is that the vas and vessels are carefully separated and freed of connective tissue and fat, and the vas allowed to come out at a point below where the vessels come out. In other words, some of the Bossini sutures must intervene between the spermatic vessels and the vas.

The salient points in his technic are:

1. Clean separation of the vas deferens and the blood-vessels from each other as well as from the sac, by the removal of all the connective tissue that binds them together, allowing the vas to come out at the bottom of the opening in the transversalis fascia, and the vessels to come out at the top of it, while the stump of the sac sinks back between the two. A couple of stitches uniting the muscles to Poupart's ligament, keep the vas and vessels permanently separated at the site of the internal ring.
2. Below the vas, suturing of Poupart's ligament to the internal oblique and often to the rectus muscle is continued all the way down to the insertion at the pubis. This is of importance to avoid recurrence in the shape of a direct hernia, as well as for the repair of the one already existing.
3. The employment of non-absorbable suture at those parts where there is tension, the preference being silver wire.
4. A number of minor points, classed under the head of common sense rules. For instance, the approximation of Poupart's ligament and muscles must be absolutely clean, without the interposition of any structure such as fat, connective tissue or cremaster muscle; alignment must be accurate; the sutures must be sufficiently close to allow no gaping of tissues between them; they must not be drawn so tight as to cut into or through the tissues; when there is much tension, the sutures must be laid closer to each other, than in the absence of tension.

Stricture and Calculus of the Ureter from the Diagnostic Viewpoint. Guy L. Hunner, Baltimore. *Southern Medical Journal*, July, 1919.

Ureteral stricture is one of the commonest causes of abdominal symptoms in women. Unrecognized ureteral stricture leads to more needless and fruitless abdominal operations than any other pathologic condition. These operations in the probable order of frequency are for appendicitis, ovarian disease, uterine and pelvic disorders, floating kidney, especially the type with hydronephrosis, gall-bladder investigations, and abdominal explorations for intestinal obstruction and adhesions.

Ureteral stricture is the cause of more kidney pathology (excluding conditions usually classified as medical) than any one factor. It accounts for the majority of hydronephrosis cases, and thus indirectly for many cases of floating or movable kidney and of pyonephrosis. The majority of pyelitis cases have ureteral stricture and obstruction as a basis. Most cases of pyelitis of pregnancy and of puerperium depend upon stricture, as do many cases of pyelitis in children. Some cases of albuminuria and eclampsia leading to premature childbirth are due to stricture. Most cases of stone in the ureter and probably many cases of stone found in the kidney and bladder arise in an area of ureteral stricture.

In differentiating stone from stricture, one must take into account the anamnesis, physical examination urinalysis, *x*-ray and cystoscopic findings, and, as a last resort, the ureteral catheter. The history offers no differential points between stricture and stone, but it must be remembered that stricture may follow the passage of a stone. In cases of stone or stricture the kidney may be large or tender, and there may be tenderness along the course of the ureter. Occasionally a point of tenderness may be elicited through the vagina. Urinalysis does not help in differentiating stone and stricture. The *x*-ray will show stones, if present, but there may be an associated or independent stricture in addition to the stone. Cystoscopy alone does not help in the differential diagnosis.

The last resort in diagnosis is the wax-tipped ureteral catheter, which takes an impression of a stone, or meets the obstruction due to stricture. Finally, *x*-ray pictures may be taken with the catheter *in situ*. But even with all these means at our command, errors in diagnosis are frequent.

The Results of Splenectomy in the Anemias. WM. J. MAYO, Rochester, Minn. *Annals of Surgery*, July, 1919.

Mayo reports the results of splenectomy in three types of anemias, splenic anemia, pernicious anemia, and hemolytic icterus.

Under splenic anemia, are included the cases of Banti's disease, which the author believes (according to E. Moschcowitz), is simply a late manifestation of splenic anemia. Sixty-one patients were operated upon, of which seven died. The deaths all occurred in advanced severe cases. Many of these cases were cured, even in the later stage. (Exact figures and data are not given.)

Pernicious anemia as a rule is not benefited by splenectomy. There seems to be no logical basis for this procedure. The author reports 50 cases, with three deaths. The cases which showed most decided improvement, were not proven cases. Many cases show marked but only temporary palliation of symptoms. Wherever pernicious anemia has developed to the stage where the blood-picture is characteristic, it is incurable, and splenectomy is only a means of palliation.

Twenty-seven cases of hemolytic icterus were splenectomized with uniformly satisfactory results. "The triumph of splenectomy is the cure of hemolytic icterus."

The No-Flap or Guillotine Amputation: An Unfortunate Resurrection. JOHN H. GIBBON, Philadelphia. *Annals of Surgery*, July, 1919.

On account of the danger of secondary hemorrhage, the painful dressings, long periods of convalescence, and extensive secondary operations, which follow guillotine amputations, Gibbon believes that this operation, as performed in the theater of war was unjustified in most cases. The extra time required to dissect up skin flaps, is so little, and the results obtained so much better, that circular amputation should be reserved for only the most extreme cases. After a flap operation, the stump can be sterilized and the flaps brought down in a very short time, thus avoiding all the disagreeable features of the no-flap operation.

Cranioplasty: The Value of a Graft of Bone, Cartilage or Fascia in the Closure of Cranial Defects Caused by Wounds in War. ALEXANDER PRIMROSE, Toronto. *Annals of Surgery*, July, 1919.

Primrose reports the results of forty-two cases of cranioplasty by various forms of graft for the relief of symptoms caused by cranial defects. All of these defects were due to various forms of war injuries. The time elapsing between the original injury and the secondary operation varied from 9-50 months. The symptoms were either subjective when the lesion was in a "silent" area, or there were evidences of organic lesion as hemiplegia, aphasia, sensory disturbances, headaches, etc.

Headache was present in all the cases except four, and these all had wounds of the motor area and suffered from hemiplegia. Headache was relieved in all but ten cases. Relief of dizziness was more certain than that of headache. Loss of memory, present in seven cases, was improved in some after a lapse of several months. Deafness present in four cases was not improved. No result was obtained when loss of vision or aphasia was present.

There were fifteen cases of hemiplegia. While many of these cases were showing gradual improvement at the time the gap was closed, it cannot be said that the operation had any effect on recovery from the condition. Jacksonian epilepsy, present in seven cases, was relieved in several, but it cannot be said that a permanent cure was effected.

Cases with the sense of fear, and feeling of insecurity associated with gaps of the cranium are decidedly benefited by the operation.

The technic of the operation is described in detail. Grafts used were either cartilage, fascia, bone, bone button, or bone from the cadaver. There was no mortality, and post-operative infection occurred in only five cases. Five cases failed to secure firm closure of the gap.

The author believes that where a gap exists in the cranium it should be relieved. The symptoms caused by the existence of the gap and not due to organic lesion, will almost certainly be relieved by a successful cranioplasty.

Malaria from the Surgeon's Standpoint. MARGUERITE WHITE, Malta. *The Lancet*, July 26, 1919.

White reports several unusual cases, operated upon for apparently surgical diseases, in whom no surgical lesion was found and which were later proved to be malarial in origin. She reports also a case of acute hemorrhagic pancreatitis due to the malarial parasite. As a result of several years of study at Malta, with the Royal Army Medical Corps, she presents the following opinions.

1. An operation may often bring on an attack of malaria of a very severe nature, and an acute dilatation of the heart during or following an operation is very frequent, often proving fatal. Ether is the safest anesthetic in malarial patients; chloroform is absolutely contraindicated.
2. The parasites of sub-tertian malaria may attack any organ, giving all the symptoms of clinical disease of that organ.
3. The negative history of malaria, and the absence of parasites in the blood are of no account in the diagnosis of a positive malaria.
4. In a malarial patient, convulsions and coma may occur in an apparently healthy man without any warning, and it is not uncommon for a man with acute cerebral malaria to be arrested for drunkenness. In every case of brain or spinal cord disease or other obscure complaints in men who have been East, malaria is one of the first things the surgeon should consider.
5. Sub-tertian malaria may simulate almost any disease, surgical, mental, or medical. It may produce such insidious symptoms, that when the patient feels ill enough to see a doctor, treatment is of no avail.
6. In the acute attacks, there may or may not be a chill, and parasites may or may not be found in the blood.

Book Reviews

Collected Papers of the Mayo Clinic, Rochester, Minn. Edited by MRS. M. H. MELLISH. *Volume X*, 1918. Octavo; 1196 pages; 442 illustrations. Philadelphia and London: W. B. SAUNDERS COMPANY, 1919.

This, the tenth volume of Mayo Clinic papers (the twelfth including the two volumes of early papers by Wm. and Charles Mayo), is arranged regionally in the same fashion as its predecessors and, like them, admirably edited by Mrs. Mellish. Although called the 1918 papers, it contains many that appeared in 1919. The total number of articles is 96, making a book larger than the 1917 volume by about 200 pages.

The Operations of Obstetrics. Embracing the Surgical Procedures and Management of the More Serious Complications. By FREDERICK ELMER LEAVITT, Formerly Assistant Professor of Obstetrics and Gynecology, University of Minnesota; Obstetrician to the City and County Hospital; the St. Paul Hospital, the Bethdesa Hospital, etc., St. Paul, Minnesota. Octavo; 466 pages; 248 illustrations. St. Louis: C. V. MOSBY Co., 1919.

The book presents a rather convenient, handy reference for the busy practitioner who does operative obstetrics. There is hardly anything in it which may not be found in one of the standard books on obstetrics as for example in De Lee's or Williams, but for those who prefer to find description and illustration of operative obstetrics in compact and consecutive form it will serve a useful purpose.

The Anatomy of the Peripheral Nerves. A. Melville Patterson, M.D., F.R.C.S., Lieut.-Colonel R.A.M.C. Assistant Inspector of Special Military Surgical Hospitals, Professor of Anatomy in the University of Liverpool, Examiner in Anatomy at the Royal College of Surgeons of England, etc. Small octavo; 165 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

This book aims to provide a brief account of the development, morphology and distribution of the cerebræ, spinal and sympathetic nerves to supply the need felt by surgeons who are dealing with war wounds. In a paragraph on "The Regeneration of Nerves," the writer maintains that after clean severance of nerves, immediate suture may be followed within a month by restoration of function; also that new, growing axons may be found in the distal stump of a divided nerve. The sketchy embryological material is introduced in an interesting way and throws light upon subsequent anatomical development. The language used is confused in many places by tautology and bad focusing.

Books Received

A Stereoscopic Atlas of Plastic Surgery of the Face, Head and Neck. With Case Reports. By Joseph C. Beck, M.D., F.A.C.S., and Ira Frank, M.D., F.A.C.S., Chicago, Ill. St. Louis: C. V. Mosby Co., 1919.

Roentgen Interpretation. A Manual for Students and Practitioners. By George W. Holmes, M.D., Roentgenologist to the Massachusetts General Hospital and Instructor in Roentgenology, Harvard Medical College, and Howard E. Ruggles, M.D., Roentgenologist to the University of California, Hospital and Clinical Professor of Roentgenology, University of California Medical School. Small octavo; 211 pages; 181 illustrations. Philadelphia: Lea & Febiger, 1919.

The Principles of Nursing. By Charlotte A. Brown, R.N., Superintendent of Nurses, New England Hospital for Women and Children; Graduate of Boston City Hospital and Boston Lying-in Hospital Training School for Nurses; Late Instructor of Nurses in the Hartford Hospital Training School for Nurses. Small octavo; 262 pages; illustrated. Philadelphia and New York: Lea & Febiger, 1919.

Industrial Nursing. For Industrial, Public Health, Pupil Nurses, and for Employers of Labor. By Florence Swift Wright, R.N.; Bureau of Child Hygiene, New Jersey State Department of Health; Formerly Secretary of the Benefit Association of the Employees of John Wanamaker, New York; and formerly in charge of Industrial Nursing for both the Cheney Brothers' Silk Mills and the Clark Thread Company. Duodecimo; 179 pages. New York: The Macmillan Company, 1919.

The Nervous Heart. Its Nature, Causation, Prognosis and Treatment. By R. M. Wilson, Capt., R.A.M.C., late Assistant to Sir James McKenzie, under the Medical Research Committee; Cardiologist to the Trench Fever Research; author of *The Hearts of Men;* and John H. Carroll, Major, M.C., U.S.A., specially attached Trench Fever Committee; Assistant Visiting Physician, City Hospital, New York; Instructor, Clinical Medicine, University and Bellevue Hospital Medical College. Duodecimo; 136 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

A Text Book of Urology in Men, Women and Children, Including Urinary and Sexual Infections, Urethroscopy and Cystoscopy. By Victor Cox Pedersen, A.M. M.D., F.A.C.S., Major, Medical Corps, U. S. Army; Visiting Urologist to St. Mark's Hospital; Member, American Urological Association. Large octavo; 991 pages; 362 engravings and 13 colored plates. Philadelphia and New York: Lea & Febiger, 1919.

The Pituitary. A Study of the Morphology, Physiology, Pathology, and Surgical Treatment of the Pituitary, together with an Account of the Therapeutical Uses of the Extracts Made from This Organ. By W. Blair Bell. Octavo; 348 pages; illustrated. New York: William Wood & Company, 1919.

Cerebrospinal Fluid in Health and in Disease. By Abraham Levinson, B.S., M.D., Associate in Pediatrics, Northwestern University Medical School; Associate Pediatrician, Sarah Morris Children's Hospital of the Michael Reese Hospital, Chicago; Attending Pediatrican, Mount Sinai Hospital, Chicago; Attending Physician, Children's Department Chicago-Winfield Tuberculosis Sanitarium. With a Foreword by Ludvig Hektoen, M.D. Small octavo; 230 pages; 56 illustrations, including 5 color plates. St. Louis: C. V. Mosby Company, 1919.

War Neuroses and Shell Shock. By Frederick W. Mott, M.D., LL.D., F.R.S., F.R.C.P., Brevet Lt.-Col., R.A.M.C. (T); Senior Neurologist to the Maudsley Neurological Clearing Hospital; Consulting Physician, Charing Cross Hospital; Director, Pathological Laboratory, L.L.C. Asylums; Corresponding Member, Neurological and Psychiatrical Societies, Paris. With preface by The Rt. Hon. Christopher Addison, M.P.; Minister of Reconstruction. Small octavo; 348 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

Psychoses of the War, Including Neurasthenia and Shell Shock. By H. C. Marr, Lieut.-Col., R.A.M.C. (Temp.), M.D.; F.R.F.P.S., Glasgow; Neurological Consultant to the Scottish Command; formerly Specialist in Nervous Diseases to the troops in Malta (1915-16); Physician Superintendent of Glasgow District Mental Hospital, etc. Small octavo; 330 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

The Medical and Surgical Aspects of Aviation. By H. Graeme Anderson, M.B., Ch.B., F.R.C.S., Surgeon-Lieut., Royal Navy; Surgeon, Royal Air Force, Central Hospital; Senior Assistant Surgeon, St. Mark's Hospital; Senior Assistant Surgeon, Belgrave Hospital. With Chapters on *Applied Physiology of Aviation*, by Martin Flack, M.A., M.B., Lieut.-Col., R.A.F., Director of Medical Research to the Royal Air Force, and *The Aero-Neuroses of War Pilots*, by Oliver H. Gotch, M.B., Ch.B., M.R.C.P. (London), and an Introduction by The Rt. Hon. The Lord Weir of Eastwood, P.C.; Secretary of State for the Royal Air Force. Small octavo; 255 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

Trench Fever. A Louse-borne Disease. By Major W. Byam, R.A.M.C.; Captains J. H. Churchill, R.A.M.C. (T), Lyn Dimond, R.A.M.C., V. E. Sorapure, R.A.M.C., R. M. Wilson, R.A.M.C., and L. L. Lloyd, R.A.M.C. (T), entomologist. With an Introduction by Lieut.-General Sir T. H. Goodwin, K.C.B., Director-General, Army Medical Services. A foreword by Major-General Sir David Bruce, K.C.B., F.R.S., A.M.S., and a summary of the report of the American Trench Fever Commission by Lieut. R. H. Vercoe, R.A.M.C. Small octavo; 330 pages; illustrated. London: Henry Frowde, Hodder & Stoughton. Oxford University Press, 1919.

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ARTERIO-VENOUS ANEURISMS AND ARTERIAL SUTURE.*

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During the last few years, a large number of cases of arterio-venous aneurisms have been published, from which it can be concluded that the treatment commonly applied to this condition has been the quadruple ligature with or without extirpation, according to the case. In the very small number of cases in which the reestablishment of the arterial circulation has been attempted, it was unusual that the surgeon had planned this when the operation was begun. More often he was led to the latter procedure by unexpected opportunity.

The ideal treatment for arterio-venous aneurisms is undoubtedly that which abolishes the arterio-venous communication, and at the same time conserves the physiological integrity of the vessels involved, or at least the more important of the two, namely the artery.

Three procedures permit this conservation of the arterial current: ligature of the communicating canal, suture of the arterial wall, and endo-aneurismorrhaphy. The superabundance of anastomoses for the return venous flow, renders much less important the conservation of the vein.

However, this ideal operation is rarely performed. In spite of the fact, that for the last few years the number of cases has been quite large, instances of surgical reestablishment of the arterial circulation have been small. Thus, though 91 cases of arterio-venous aneurisms have been presented before the Societé de Chirurgie during this period, the ideal operation was performed only nine times. It would be of great interest therefore to systematically examine the results.

Quadruple ligature and extirpation, often are followed by disturbing sequelæ, for usually the large trunks are involved, and it is these that it is most important to save. Cerebral ischemia and paralysis, in the case of the carotids; extensive or partial gangrene in the case of the vessels of the limbs; disturbance of muscle function in all cases—these are too often the penalties for obliteration of the main arterial current.

In the more favorable cases, at the end of a month or two, everything appears normal after ligature. Cunéo has even stated that arterial pressure had then become normal in the operated limb. This may be true in the state of rest, but when the wounded man works, as soon as the limb is fatigued, he is seized by pains or cramps; he suffers from intermittent functional insufficiency (claudication), just as horses with congenital atresia of the arteries, limp when they are fatigued.

But it is possible in a great number of cases, to reestablish the blood current. Many operations which end in quadruple ligature, should have permitted the reestablishment of the arterial current. The perfection of the technique leaves no doubt about this point of view, and arterial surgery is improving more and more in this direction.

In 1914 and 1915, Bulletins de la Societé de Chirurgie, published 22 cases of arterio-venous aneurisms; there was not one case of arterial suture, but surgeons like Pierre Duval, state that in some of these cases, skillful arterial suture could have been performed.

In 1916, 16 cases of arterio-venous aneurism were published. Some surgeons attempted suture, but none was successful.

In 1917, 40 cases were published. Suture was performed successfully four times (Maudaire, Piollet, Cunéo, 2 cases), that is in 10% of the cases.

In 1918, 13 cases were published, in five of which the arterial circulation was reestablished—a little less than 40%. The technique was also more varied: 2 cases of arterial suture (Chutro, Sencert); 2 ligatures of the communicating canal, (Chutro, Raymond Gregoire); 1 endo-venous suture (Lecène).

I firmly believe that as the anatomy of this lesion, and the ease—comparative, to be sure—of suture becomes lesser known, the number of instances will increase.

There are, however, cases in which quadruple ligature, with or without extirpation, will be the only operation indicated, either because it is the only one justified or the only one practicable. It is the only one justified in certain cases: When, as in a case of Cunéo's, the aneurism is situated at the end of an amputation stump; when the arterial wall is profoundly altered and presents in addition to an arterio-venous aneurism, an aneurismal dilatation, as in a case I reported in April, 1918, in the *Revue de Cherurgie;* when the wall of the artery, while outwardly normal, is so friable, that it is impossible to pass a suture without tearing the vessel; when the loss of substance has been so great, that suture would obliterate the lumen; in all these cases quadruple ligature with or without extirpation, is the only operation justified, since suture would be useless.

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* Read before the Societé de Chi rurgie de Paris, March 11, 1919.

Quadruple ligature, with or without extirpation, is sometimes the only operation practicable. There are several indications for this operation.

First, the seat of the lesion. I do not see how one could treat otherwise than by quadruple ligature, an arterio-venous aneurism of the vertebral artery for example. What can we do for a jugulo-carotid communication situated at the base of the cranium, other than ligature of the carotid and jugular, and tamponade of the lateral sinus?

The stage of the wound, is a factor, to which up to the present, not enough attention has been paid. Experience with a rather large number of cases leads me to think that this is of considerable importance.

When the penetrating agent opens the artery and vein at the same time blood can pass immediately from the artery into the vein; murmur and thrill are present immediately; nevertheless this is not a true arterio-venous aneurism, (with a permanent communication). It is simply a simultaneous wound of artery and vein. A certain length of time is necessary for the permanent establishment of the communication. The preparatory damming process begins very soon. The common sheath of the vessels, infiltrated with exuded blood, reacts by means of a diffuse inflammatory process, which extends to quite a distance beyond the site of the lesion; and meanwhile the endothelium of the two vessels becomes continuous. This process occupies 30 to 40 days.

All surgeons who have operated upon arterio-venous aneurisms at this stage of their development, were struck by the peculiar difficulties, often insurmountable, in exposing and liberating the vessels, embedded in a sclerotic sheath.

To operate within the first 40 days after the injury, is to resign oneself in advance to the quadruple ligature, for suture of the arterio-venous communication is practically impossible at this period. Tuffir himself during a discussion in 1916 (p. 2763), made several statements in this connection, which our late observations found to be absolutely exact.

Dense and extensive adhesions exist in certain cases for an indefinite time after the injury. These alone may prevent any other operation but ligature of the vessels above and below the lesion; they may even render extirpation impossible. There are in addition, cases in which, as a result of suppuration of the wall, there exists a veritable fibrous sheath, enveloping the arterio-venous communication.

I believe that this obstacle will become less and less important, and that with certain exceptions, we will reach the point, where in spite of extensive adhesions, suture of the orifice of communication will be possible. I shall return to this phase of the subject.

Finally, the caliber and importance of the vessels is a consideration which may make quadruple ligature followed by extirpation, the only practical operation. I have in mind aneurisms situated in vessels of the second order. They are relatively rare. It is generally conceded that in these cases it would be useless to attempt a long and difficult operation, when a more simple and rapid procedure will give the same result. The following instance is illustrative:

Case I. *Arterio-Venous Aneurism of the Anastomotica Magna in the thigh.*

M— (Wilhelm)—— of the —th German Infantry, wounded March 1, 1918, at La Pompelle. Multiple wounds of the lower extremities. Evacuated from H. O. E. at Epernay on March 11th. Arrived on the 16th of March at Hôpital Grand-Lebrun, Bordeaux. Physical examination showed at the level of the Canal of Hunter, an ill-defined tumor, pulsatile, expasile, in which palpation elicited a pronounced thrill, which was transmitted along the femoral vessels up to the middle of the thigh and downward to the level of the opening in the adductor magnus. The diagnosis of arterio-venous aneurism of the femoral was made.

Operation, March 18, 1918. Incision over the femoral, exposed the artery which was dissected for a considerable length. It was found that the tumor was independent of the main artery, and was attached to the anastomotica magna a little below its origin. Dissection of the Tumor. Quadruple Ligature. Extirpation. Cure.

In spite of these important limitations, the re-establishment of the arterial current, is indicated in a large number of cases, and this number will increase as surgeons perfect their technique.

It is important to emphasize that we are discussing only arterio-venous aneurisms of recent origin. At this stage, the lesion is practically an arterio-venous fistula in most cases, the "phlébartérie" of the older authors. It is probable that the fear and danger of the operation will exist as formerly, until we see fewer and fewer of the old classical forms of cystic aneurisms which represent the advanced stages to which this condition should not be allowed to develop.

Now, in cases of "phlébartérie," it is quite exceptional to find the opening of any considerable size Indeed, one is often surprised at its small dimensions, and after the section has been removed, the surgeon is apt to say to himself that if the adherent surface of the vessels had not been so large, it would have been very easy to suture the defect. In effect, it is on account of the extent of the adhesion of the vessels that the surgeon often makes quadruple ligature his method of choice. This is an error. The zone of adhesions dissects readily, and can be denuded easily with the scalpel.

It is important again to return to this particular point, that the dissection of the lesion is impossible during the stage of its formation. During the five or six weeks in which the double arterial and venous wound is undergoing transformation into a permanent arterio-venous communication, the inflammatory infiltration around the vessels makes them practically inextricable. It is necessary therefore to delay the cure of the arterio-venous aneurism until the permanent anastomosis has formed, namely about 50-60 days after the injury. Mondor and I have noted in addition, that after this date there is often a diminution in the physical signs.

The method to be employed in obliterating the orifice of communication depends entirely upon the ease of the dissection.

1. The dissection is rarely sufficiently easy to permit complete isolation of the vein and of the artery, leaving nothing between them but the canal of communication. Ligature of this communicating structure is the obvious procedure. But it must be remembered that such cases are rare. In 91 cases of arterio-venous aneurisms I have found only one (Chutro, April, 1918) and another which I published with Mondor in *Lyon Chirurgical* (August, 1917). A single ligature may be placed in the communication or more. When a true canal exists, place one suture against the artery, another against the vein, and divide between the ligatures. The other details are uninteresting. This procedure suffices to prevent the flow of arterial blood into the venous current.

2. Generally, the zone of adhesion is so dense that it is difficult to isolate the vessels without opening them at the point of contact.

When the dissection is finished, there are usually two orifices, one in the artery and one in the vein. It is rare to find these openings of large dimension: 5-6 millimeters is the rule. A hole of a centimeter or more is rare. The periphery is sufficiently thick and resistant to allow the passage of a needle and the traction of a suture which, with a buttonhole stitch, closes the defect.

Suture is the method of choice in cases of this type. It can be performed on both arterial and venous orifices. But often the vein is dilated and irregular, and as its conservation is of less importance than that of the artery, the operation is rapidly terminated by the resection of the vein between two ligatures. This method has been followed by Cunéo, Piollet, Maudaire, Sencert, Gregoire.

CASE II. *Arterio-Venous Aneurism of the Axillary Artery. Suture of the Artery.*

G— (Auguste), wounded in the shoulder July 18, 1918, by a bullet, entered the service October 3, 1918, for an arterio-venous aneurism of the axillary artery. The scar of his wound, situated on the external fold of the axillary fossa, was very small, and circular, about like a fifty centime piece.

Nothing abnormal in the region of the arms and the axilla, no swelling, no discoloration, no varices. The cicatrix was not attached to the deeper tissues. There was felt in the axilla a forcible rhythmic thrill, synchronous with the cardiac pulsation. It reached its maximum intensity beneath the pectoralis major, along the vasculo-nervous trunks. It was transmitted with decreasing intensity downward to the bend of the elbow, and upwards along the subclavian.

The left radial pulse has disappeared. The pulse of the brachial could be felt very faintly at the bend of the elbow. On auscultation, a continuous purring murmur is heard, with systalic accentuation. Functional symptoms were vague pains radiating down the arm and forearm, slight weakness of the left upper extremity, and slight coldness of the left hand. Heart sounds normal. Respiratory and urinary organs normal.

Operation, October 16, 1918. Incision over the axillary artery in its lower portion. Dense adhesions were found, rendering the dissection difficult. The veins were much dilated; the axillary vein was of thumb's thickness; the artery was small, hard to see, hidden in cicatricial tissue. A temporary ligature was passed over the axillary above the aneurism, and over the brachial vein below the aneurism.

With difficulty a voluminous sac, situated on the vein at the level of the origin of the profunda was exposed by dissection. This venous sac was isolated between the two ligatures, and delivered; a ligature was passed at its neck at the level of the arterio-venous communication, which practically amounted to a lateral ligature on the artery. Excision of the sac. Suture of the skin.

At the end of the operation the radial pulse could be felt, which was not present before the operation, nor at the moment the orifice was closed. During the course of the operation, the brachial artery below the communication was remarkably small. During the night, the lateral arterial ligature loosened, which caused a profuse hemorrhage. A tourniquet was applied rapidly. The wound was reopened and a mattress suture was applied to the hole in the artery.

This was then reenforced by a second suture line which took in only the perivascular fibrous tissue. The wound was closed, the suture held, and the pulse could be felt below the level of the suture. The brachial artery at the level of the fistula, presented a slight fusiform dilation. The beat of the brachial artery could be felt down to the elbow. The radial pulse could be felt at the wrist. There remained not a suggestion of a thrill. Perfect cure.

On his discharge from the service the ascillometric measure (Pachon) was the same in the left forearm as in the right: Maximum 15, minimum 10½.

Following the operation the patient had a musculo-spiral paresis, which rapidly disappeared. It is probable that the tourniquet applied at the moment of hemorrhage, provoked by the slipping of the ligature, was the cause of this.

3. There remain now the cases where the adhesion of the vessels is such that it seems impossible to liberate them, and also those in which there is considerable distention of the vein, transformed into a large sac. One is tempted to take the quickest route, to pass ligatures above and below, and to excise the whole sac.

But in these cases the surgeon can apply a suture if it is decided to avoid ligation. It is necessary after applying temporary hemostasis, to deliberately open the sac, find the orifice of the communication, and suture it with an overcast stitch. This endo-venous suture, an example of which Lecène has reported, is according to him very easy. It is likely that as surgeons become more familiar with the condition, the number of cases of quadruple ligation, with or without extirpation will be considerably diminished, and that many arterio-venous aneurisms will be cured with preservation of the arterial current.

The main difficulty in all vascular suture operations is hemorrhage. It is evident that such surgery cannot be performed without temporary hemostasis.

The tourniquet would be a simple means for this purpose if it could be always and completely applied; but this procedure should be condemned. It predisposes to errors; surgeons have placed their sutures outside of the communication, vessels have been left untied, with resultant severe post-operative hemorrhages. It is essential that the blood circulate during the operation; this is the best guide to the lesion and for the establishment of hemostasis.

Temporary hemostasis should be made in the wound itself. The artery should be attended to first. It should be exposed as near as possible to the lesion, an emergency ligature held by an assistant. A serrefine or a rubber tube will stop the flow of blood above the fistula. It is essential to pass the first ligature over the artery and not over the vein. If because it appears easier the ligature is passed first over the vein, the operator will immediately become aware of the increased tension in the vein or in the venous sac, which may even rupture. I have reported such a case.

On the other hand, when the artery is ligated first, the flow of blood into the aneurism is considerably reduced.

There remains one last reason which might deter the surgeon from attempting vascular suture; that is the lack of necessary materials, for very often there are not at hand the needles and silk sterilized in vaseline without which it would seem impossible to perform vascular suture.

I will not say that these materials are useless or superfluous, but I can affirm that their absence is not a good reason for renouncing vascular suture. Twice I had to perform the operation with intestinal suture needles, and nevertheless obtained good results. The first case was that cited above. The other case was one of suture of the femoral on account of wounds. Even though this was not a case of aneurism, it proves that one can suture an artery with ordinary needle and thread without fear of thrombosis or secondary obliteration.

Case III. *Wound of the Femoral Artery by Knife Cut. Suture of the Arterial Wound.*

B. ......, butcher boy, was admitted to the "Salle Lisfranc" March 24, 1912. On the anterior surface of the thigh, there was a wound 2 cm. in length, situated at the apex of Scarpa's triangle. A knife which he was using to cut beef, had slipped and pierced his thigh. There was abundant hemorrhage which stopped spontaneously.

On admission, there was a large hematoma of the thigh. The interne on duty administered spinal anesthesia, in order to tie the femoral, but exploration of the wound did not indicate its ligation.

During the night of the 24th of March, he had a profuse hemorrhage which was stopped by compression.

On the 27th of March, at 11 A. M., he had another hemorrhage, also arrested by compression. On April 1st at 5 A. M. he had another very profuse hemorrhage, when I was called to see him.

Operation. Incision for ligature at the apex of Scarpa's triangle. Abundant blood infiltration in the vessel sheath. I found a longitudinal wound 1 cm. long on the external surface of the artery, at the level of the bifurcation of the common femoral and on the superficial femoral. A temporary ligature was passed above and below for hemostasis by traction. I was able to perform a complete suture of the wound, but as special needles were not at hand, I used a fine seamstress' needle and silk.

Hemostasis was easily obtained. Cure without complication. Fifteen days afterwards the beat of the femoral was easily palpated in the middle of the thigh.

Summary. The surgery of arterio-venous aneurism should be and is becoming more conservative. The obliteration of the communication is the ideal operation, which is gradually becoming the method of choice. Quadruple ligature and extirpation should be reserved for those cases in which on account of the location, fibrous infiltration, the condition of the vessel wall, and the character of the vessels, no other operation can be performed.

LOCAL ANESTHESIA IN OPERATIONS UPON THE THYROID GLAND.

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Cincinnati, O.

Much has been written regarding the advisability of using local anesthesia in operations upon the thyroid. Much has been written against its use and the same may be said of general anesthesia. Both have their advocates, and results obtained from the use of both local and general anesthesia in these cases seem equally good in skilled hands. Local anesthesia has been given the preference by such men as Kocher, Socin, Bier, Madelung and Bainbridge; while Mayo, Porter and others favor ether or the combinations.

From January 1, 1918, to July 1, 1919, fifty-five cases of thyroid enlargement presented themselves under my care at the Seton Hospital. Thirty-five were cases of exophthalmic goiter, while twenty consisted of adenomata, colloid and fibrous hypertrophies without systemic symptoms. Five of the thirty-five cases of exophthalmic goiter were refused operations because of their advancement—one dying after remaining in the hospital three weeks. Of the remaining fifty, all were operated upon under local anesthesia, with one death, two hours following the operation. (The death recorded was one of my early cases and was a bad risk.) In the simple goiters the hypertrophied portion alone was removed. Of the thirty exophthalmic cases operated upon in twenty I removed one lobe only, while in the last ten I removed both

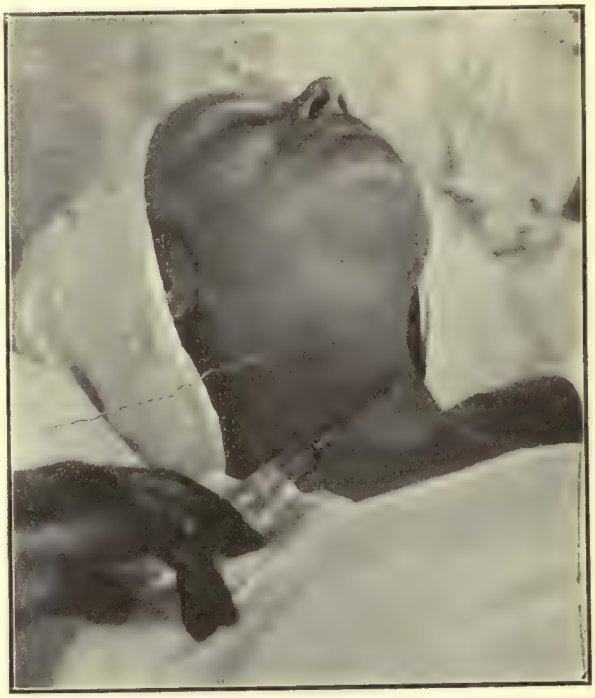

Fig. 1—Subcuticular Injection of Cocaine Solution.

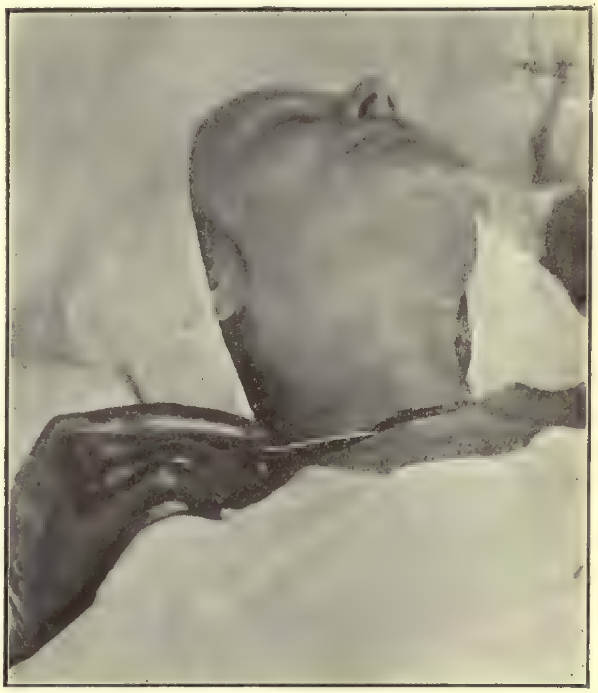

Fig. 2—The Skin Incision.

lobes and isthmus, leaving only a small portion of glandular tissue at each pole.

In five of the twenty cases in which only one lobe was removed, the other lobe was removed at a subsequent operation. The fifteen cases in which one lobe only has been removed show marked improvement, so much so that they have refused further operation upon the other lobe. Of the fifteen cases in which both lobes were removed, ten may be classed as cured (their heart action has returned to normal and increases only slightly upon exertion). Of the five remaining cases the time is too recent since operation to make a satisfactory report.

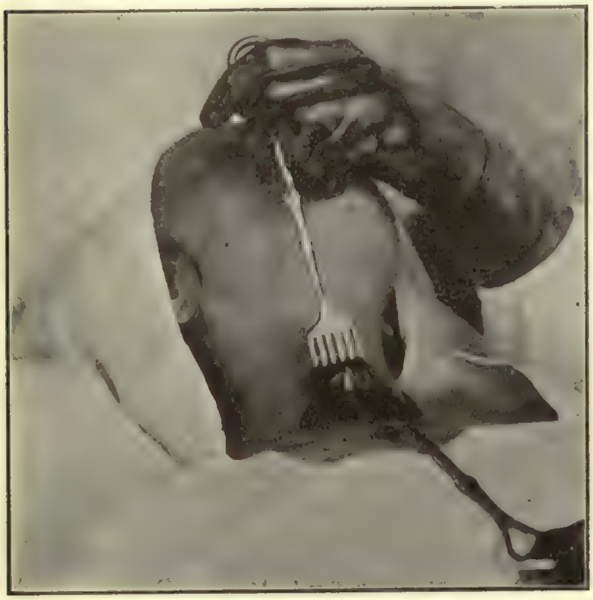
Fig. 3—Retraction of the Skin Flaps.

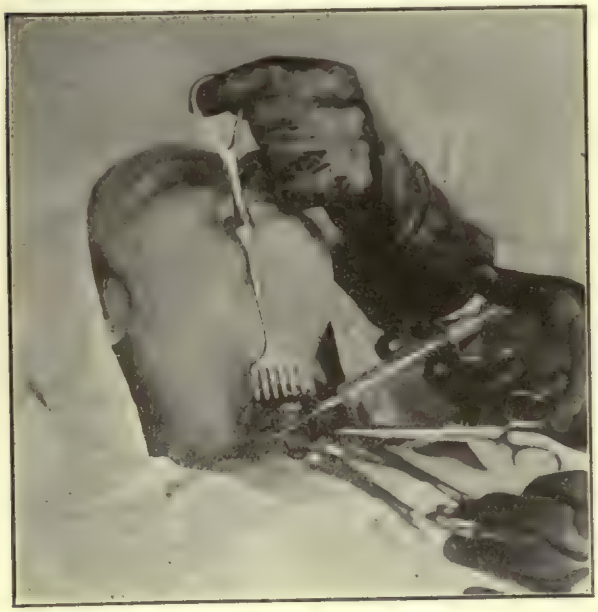
Fig. 4—Infiltration of Muscles Prior to Cutting.

In the above group of cases, arterial ligation was not used in any case. Of the five cases which were refused operation, two had received a large number of *x*-ray exposures without apparent results. These two patients are now known to be dead. The other three were not considered risks for arterial ligation. Whether the case which died would have been benefited by arterial ligation I am not prepared to say, but I am satisfied that a greater risk can be taken when operating under local

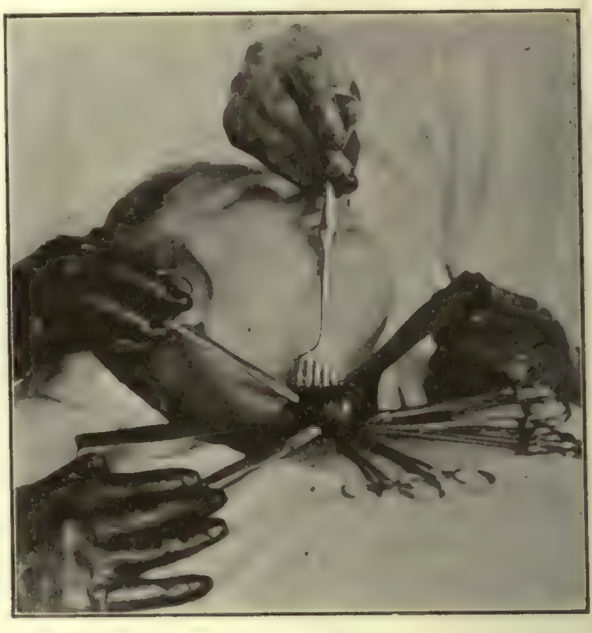
Fig. 5—Raising the Gland.

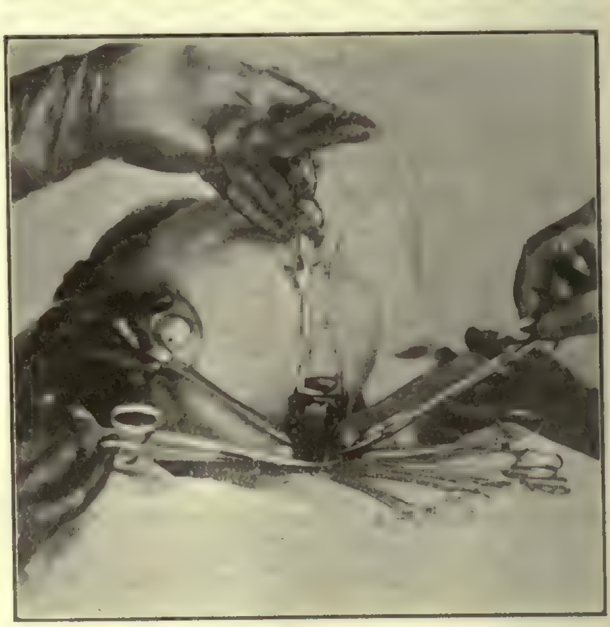
Fig. 6—Excision of Right Lobe of Thyroid. Lower Pole Clamped.

anesthesia than when operating under ether or the combinations.

The advantages accredited to local anesthesia are the following:

1. There is no need for speed—you can readily see what this means while working in such a complicated area.

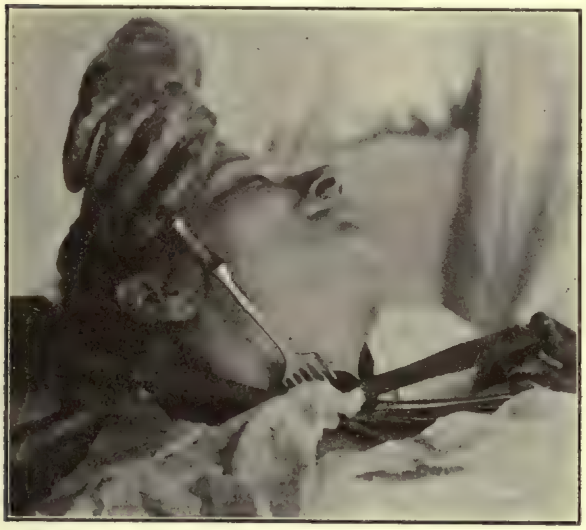

Fig. 7—Hot Pad Applied to Control Oozing After Removal of Gland.

2. Hemorrhage is diminished by the epinephrin ("adrenalin") which may be added, thus presenting a clear field for dissection. The epinephrin also serves to lessen the danger of acute thyroidism, supposed to be caused by the colloid freed by the thyroid gland as it is being enucleated.

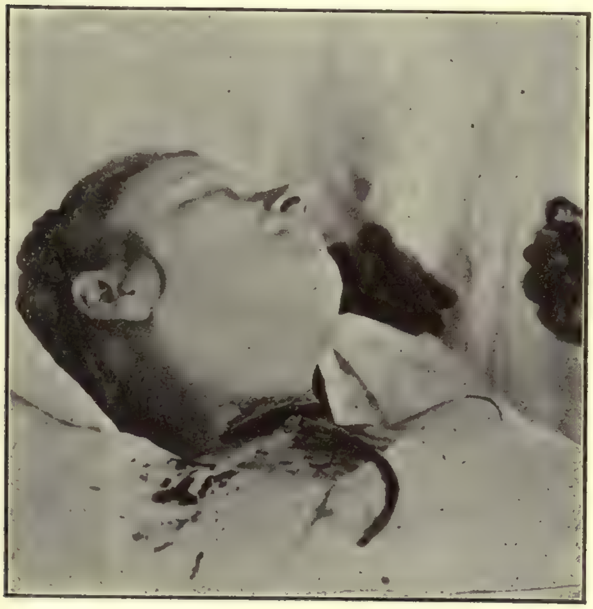

Fig. 8—Suture of Deep Structures with Tube Drainage.

3. Better protection to the recurrent laryngeal nerve by the possibility of phonation in the conscious patient.

4. Diminution of shock by gentleness of manipulation, which is a requisite to true local anesthesia.

5. Diminution of shock by nerve block.

6. The patient can be of aid to surgeon, i. e. he can hold his breath at critical steps throughout the procedure, thereby controlling the movements of the throat.

7. Avoidance of post-operative vomiting, thereby diminishing the risk of secondary hemorrhage.

8. No extra work thrown upon the kidneys or heart as with general anesthesia.

9. The patient can drink freely both during and immediately following the operation, thereby allowing a free flushing of the excretory system.

10. Maintenance of normal blood-pressure.

11. Elimination of dread and dangers of general anesthesia, a large factor in establishing confidence in the surgeon, thereby assuring nerve-calm and the lack of that fear which every operator of experience dreads, not only in goiter operations, but in other surgical procedures as well.

The disadvantages so frequently cited, such as the patient becoming uncontrollable if anything unforeseen happens, do not hold ground if one is accustomed to using local anesthesia. For a man accustomed to general anesthesia, to occasionally attempt a case with cocaine is but to court failure, because cocaine surgery requires a technic and a patience entirely foreign to general anesthesia.

The treatment preparatory to operation is of the utmost importance and should be insisted upon. Not infrequently a patient will rebel at continuous confinement to the bed for several weeks before operation, but the operator should refuse operation rather than chance an unsuccessful outcome by operating before he is confident that the patient is in fit condition. We insist upon every patient with exophthalmic goiter remaining quietly in bed for at least one week before operation.

Bromides may be prescribed by mouth. The heart is outlined frequently to determine the extent of dilatation or valvular lesions, and the urine is frequently examined. I place great stress upon the preliminary alkalinization of these cases and find that it lessens the toxicity following the operation.

As a general rule thyroidectomy under local anesthesia may be performed with safety if the pulse after a moderate amount of exertion (as in rising from the bed, walking across the room and then returning to bed) does not exceed 120 beats per minute. We have made this rule on the assumption that an operation with careful manipulation causes a reaction which increases the pulse rate from 20 to 30 beats. It can readily be seen that were we to operate with a pulse of 140 to 150 that the reaction following would raise the pulse to 170 or 180 and would in all probability cause death, whereas with the pulse at 120 or less (other factors being equal) the reaction would raise the pulse to 140 and it would then stay within the zone of safety. (We use these figures merely as a control to the toxicity of the case.)

If the rapidity of the heart action does not subside within a reasonable period arterial ligation may then be resorted to. Arterial ligation in itself, however, is not without danger. *X*-rays, radium and hot water injections have their advocates.

My conclusions are as follows:

1. I advise early operation whenever possible—In skilled hands there is no more danger in removing a simple adenomatous or benign (not exophthalmic) goiter than there is in interval appendicectomy; and benign goiter should be considered as potentially dangerous as a simple appendicitis or a hernia.
2. Preliminary observation and treatment in all cases of exophthalmic goiter with intensive study of the heart, kidneys and blood, are important.
3. If case does not respond to internal medication and rest, arterial ligation should be performed.
4. As a general rule I do not perform thyroidectomy when the pulse after a moderate amount of exertion exceeds 120 per minute.
5. I believe that a greater risk can be taken when local anesthesia is used than is possible under general narcosis, and that arterial ligation will be less often indicated.
6. Removal of both lobes and isthmus gives the best results in exophthalmic goiter and causes less reaction following operation.
7. Thyroidectomies can be done painlessly and thoroughly under local infiltration.

Hospital Research.

One of the weaknesses in the practice of surgery is that men tend to become stationary, and call it standardizing their work. A surgical research department in a hospital would save the surgeons from becoming fossilized. The chief value of research work consists not in the number of new facts discovered, but in keeping all workers still students. The student type of mind, always groping for new light as it does, is a *sine qua non* if a surgeon is going to give his patients their due.—Jasper Halpenny in *The Canadian Medical Association Journal.*

MODERN TECHNIQUE IN HERNIA OPERATIONS.

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New York City.

Recurrences after hernioplasty, claimed by Moschcowitz[1] to reach in all types the large proportion of 7% or more, render the discussion of operative technique in order. The statistics of some operators are not always reliable for they represent selected cases. The results of operations on children and adolescents are much better than in the aged or in those of middle life. Recurrence, according to Moschcowitz[1], is due to a poor type of operation or to poor execution of a well selected operation.

In general, the most satisfactory theory of the etiology of abdominal hernia is a disproportion of pressure in favor of intra-abdominal as against extra-abdominal. The weakened support of points in the abdominal wall, as exemplified in the so-called rings, especially in the lower portion where the force of gravity aids, give way and hernia results. The obvious method of repair is first to remove the source of intra-abdominal extra pressure, such as fluid, fat, gas, tumor, etc., by appropriate treatment, operative or otherwise, and to buttress the weak points by placing fascia supports over them as near the exits as possible, at the same time so suturing peritoneum as to render it smooth over the former funnel-shaped openings. Unfortunately, in some instances, as at the internal inguinal and femoral rings, it is impossible to entirely accomplish this without removing or injuring important structures, such as the cord, femoral vessels, etc. It is important, however, to endeavor to reach as near this ideal as may be possible. This is the excuse for the presentation of this topic.

Inguinal hernia is the most common form of rupture. The operation which has been successful in my hands is a combination of several methods with one or two original points. A curvilinear incision is made starting from a point just above and to the mesial side of the external ring and ending at a point external to and just above the internal ring. This skin incision brings the skin suture line above that area in the crease of the groin which is so hard to sterilize and therefore so prone to infection. It also places the skin suture line at a different level from the deeper line of suture. The skin flap is laid back and an incision is made through the external oblique aponeurosis about on a level with the foramen of exit of the hypogastric branch of the iliohypogastric nerve. Formerly I made a curvilinear incision of the fascia also, but I have discontinued this because it incises the fibers of the external oblique instead of splitting between them. The lower end of this incision is just above the internal pillar of the external ring. The upper end lies just above the internal ring. This flap is then pulled down, avoiding injury to the hypogastric branch of the iliohypogastric nerve and the shelving edge of Poupart's ligament is demonstrated. The structures of the inguinal canal are then separated. The cord is lifted and the sac, which usually lies posterior and superior, is dissected back to its origin. Throughout the operation, all bloodvessels are carefully clamped and tied, as this region is productive of hemorrhage when this detail is not closely observed.

Before opening the sac, it must be plainly demonstrated that it is not composed of bladder nor of the type called sliding hernia. Bladder will be recognized by a peculiar fatty formation which is more or less firmly attached toward the median line. Sliding hernia will be recognized by the presence of large intestine which is firmly adherent to what one might imagine was the posterior layer of an ordinary sac. If bladder is present, it is carefully pushed aside. If a sliding hernia is present, a new mesentary is created for the intestine, after which it will be found that it is reduced with comparative ease. The sac is opened and the contents returned to the abdomen. If omentum is present in such large amounts that it can not be reduced, the nonreducible portion is ligated with interlocking chain ligatures and removed. Frequently, on the right side, it will be possible to remove the appendix. If upon opening the sac the intestine is found to be strangulated, a few moments are spent with hot applications watching for return of circulation and peristalsis before performing resection, if necessary. The sac is then transfixed, taking care that the intestine is out of the way, and a double threaded suture is passed up under the transversalis fascia, through it and through the external oblique fascia as near the anterior spine of the ilium as possible. The free ends of the transfixion ligature are then threaded on a similar needle and passed up in the same manner to be tied underneath the skin. This obliterates the dimple formerly noted at the internal ring and, as demonstrated during an intra-abdominal operation causes the intestine to slide toward the perineum or outward into the iliac fossa.

The next step is the repair or buttress of the weak points in the inguinal region. Lifting and carefully dropping the ilio-inguinal nerve, the conjoined tendon, as in the Bassini operation, is joined by mattress sutures to the shelving edge of Poupart's ligament. In doing this there are two sutures, the improper placing of which is responsible for the majority of recurrences. One is a suture placed just external to the internal ring which prevents splitting outward; and the other is placed at the lower angle of the incision including the conjoined tendon and Gimbernat's ligament. The cord still being lifted, the essential difference in the author's operation may be noted. The superior cut edge of the external oblique is brought down underneath the cord and is carefully fixed to that portion of the aponeurosis of the external oblique just above the shelving edge of Poupart's ligament. The inferior edge, the cord having been dropped, is now brought over the cord and sutured to the smooth surface of the external oblique aponeurosis superiorly. The skin is then closed by Michel clamps or a subcuticular suture and court plaster method.

This operation provides two aponeurotic layers underneath and one above the cord and is especially of use in the direct type of inguinal hernia where the conjoined tendon is poor in quality and widely separated. I have operated upon over fifty cases with this method, lasting over a period of years. In no instance in the brief series and in hospital cases which could be followed, has there been any recurrence. In one case where the ordinary Bassini operation was performed on one side and my method upon the other, it was interesting to note a recurrence after the Bassini operation and a perfect result on the other side.

In our Metropolitan Hospital, because of cardionephritis, tuberculosis and other conditions, it frequently becomes necessary to operate on these cases under local anesthesia. A skin infiltration of 1% novocain solution with one drop of adrenalin, one-to-one-thousand, to every sixty drops of novocain solution, with a wait of fifteen minutes by the watch, is the initial procedure. This is followed by a thorough infiltration with one-half of 1% novocain solution and there is little pain experienced thereafter if the neck of the sac is infiltrated before manipulation. We have found it possible to remove the appendix painlessly in some of these cases.

The Bassini[2] operation which dates back to 1891 has the following disadvantages: First, the sac is not dislocated; second, there is no extra layer of fascia below the cord. The Halsted method relies upon the cremaster muscle which has no healing power and the cord is placed under the skin where it can easily suffer trauma. The Halsted method of utilizing the fascia and fibers of the rectus is wrong, for the pull is vertical and tends to separate constantly. Ferguson's method is faulty because there is no transplantation of the cord. The Andrews method grasps the conjoined tendon and the superior border of the external oblique incision and joins them at one bite to Poupart's ligament, making a bulky mass. This method also fails to dislocate the cord. The Kocher method is an unsurgical procedure and has been discarded. The advantages claimed for the author's method are as follows: First, a more natural, firm aponeurotic protection anteriorly and posteriorly to the cord and to the abdominal contents; second, a quicker return to health and earning power on the part of the patient (out of bed in twelve days, in fourteen days out of hospital); third, the absence of scrotal edema due to constriction of the cord at the external ring; and fourth, a better result at the end of a period of months than the old Bassini operation or any of its more modern modifications.

The next most common form of hernia is the femoral. The diagnosis is not difficult if one remembers that the femoral sac comes down underneath Poupart's ligament to the mesial side of the femoral vessels and out on the upper part of the thigh through the saphenous opening. All femoral hernial sacs lead below Poupart's ligament. The operative treatment may be summarized as follows: First, ligation and extirpation of the sac. This is usually ineffectual except in children. Second, incision in the femoral region. This does not displace the sac and does not place a firm covering over the opening of the hole in the fascia transversalis (Bassini, DeGarmo, Berger, Coley, etc.) Third, high approximation of Poupart's ligament to the pubic bone by tacks, etc. The objection to this is the presence of a foreign body and it does not place obstruction to the ring within. Fourth, the Moschcowitz method which, in my opinion, is the operation of choice. This consists of an incision above Poupart's ligament, parallel with the ligament, division of the aponeurosis of the external oblique, lifting the cord as in inguinal hernioplasty, and an incision of the transversalis fascia on the mesial (inner) side of the femoral vessels, retracting these. Cut from without in, to avoid an abnormal obturator artery. Demonstrate the sac of the hernia and bring it into the wound. If the intestine is strangulated, nick the sac at the neck and remove the fluid. Resect the intestine, if necessary. Close the sac and proceed as in inguinal hernia. The treatment is now the same as for direct inguinal hernia,—Bassini, Andrews, or my modification, taking in both Cooper's and Gimbernat's ligaments.

The third and last common form of hernia is umbilical. At birth the ring through the funicular portion of the transversalis fascia admits four structures—superiorly, the umbilical vein; inferiorly, two hypogastric arteries and the urachus. After birth, when the cord is tied, the hypogastrics obliterate by clot. Before birth the urachus becomes a fibrous cord. Both structures run to the bladder base. The umbilical vein takes longer to obliterate and finally fuses with the round ligament of the liver. This makes a three-point suspension of the umbilicus. Soon after birth, the transversalis fascia becomes much strengthened by connective tissue and is called Richet's fascia. (Moschcowitz[1]). Following are the types of umbilical hernia:

I. Congenital—formed before Richet's fascia is formed and at the site of the umbilical vein opening.

II. Infantile—due to imperfect Richet's fascia and occurring at the umbilical vein opening.

III. Adult—presupposes a weakness in ligaments. It occurs at the umbilical vein opening, and is due to intra-abdominal pressure, childbirth, tumors, etc. The signs and symptoms are the usual ones of hernia. The treatment is a radical operation by the Mayo method. It consists of an elliptical incision, excising skin and fat on the site of the sac which is composed of skin, Richet's fascia and peritoneum, opening this and reducing or amputating the contents, with or without anastomosis. The peritoneum should then be closed transversely, and aponeurosis overlapped from above downward, thus restoring the three point suspension. This operation is uniformly successful.

I trust that this demonstration shows the necessity for still more careful work in the treatment of hernia. The fact that there is still over 7% of recurrence shows that we have not arrived at an ideal method as yet, but the work of Moschcowitz along these lines has laid a firm foundation for further study and I feel sure that the coming years will see a reduction in the number of recurrences in adult hernias which will equal that found in children, namely, nine-tenths of 1%.

1 WEST SIXTY-EIGHTH STREET.

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1. Moschcowitz—Operative Therapeusis (Johnson).
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MUSTARD GAS BURNS.*

W. P. Carr, M.D.,
Washington, D. C.

Last spring and summer I treated four patients burned with mustard gas. There are at least seven varieties of gas included under this general term and I am unable to say which variety produced the lesion in my cases.

The phenomena presented by these burns were so unusual and interesting to me that I hope a brief report of them will be of interest. Much of the unusual features were present in each case and were as follows:

1. A long interval between exposure and the appearance of symptoms. This interval varied from sixteen to thirty-six hours, and reminded me in this respect of poison ivy. No disagreeable sensation was felt at the time of exposure, nor until after the lapse of many hours, when pricking and stinging sensations commenced in the skin. This was followed a few hours later by the appearance of vesicles which rapidly coalesced into large blebs. One patient did not even know for thirty-six hours that he had been in contact with the gas.

2. There is an acute stage during which the poison absorbed into the tissues continues its destructive action. This acute stage may last a few days, or for the astonishing period of two or three months, and may be interrupted by quiescent intervals when the wound seems to be healing.

In this respect also the gas acts in a manner similar to the toxin of poison ivy and some similar substances, which cause recurrences after apparent healing. This active destruction may go on in part of a burn while other parts of it are rapidly healing.

In one of my cases, although part of the wound healed with remarkable rapidity, even where the whole thickness of the skin was destroyed, successive layers of slough continued to form and shed off in the deeper portion for about two and a half months; until in places the destructive action had eaten nearly an inch into the underlying muscles over an area of about six by ten inches. Numerous cultures were made during this period but no organisms were found except, on two occasions, the hay bacillus.

I am inclined to believe that the poison killed bacteria as well as the patient's tissues.

The wound would look healthy for a week and then become covered with dead tissue and bathed in pus which always proved sterile or practically so, and when this slough loosened and came off a clean, healthy looking surface was left again. This recurred repeatedly, sometimes over part of the raw surface, sometimes over the whole of it until I almost despaired of its ever healing. Cauterizing the surface with silver nitrate aggravated the condition, and wet dressings of Dakin's fluid and other mild antiseptics did no good except to help dissolve the sloughs.

3. Individual susceptibility varies greatly, as it does to poison ivy and its congeners. Three of my patients were experimental chemists working on war gas in the same governmental laboratory. They told me that sixty workers in this laboratory had submitted to small experimental burns in testing gases, or protective skin coverings. There was, they said, great variation in susceptibility and a few were practically immune.

The duration of the acute stage and consequent severity of a burn depends largely, therefore, upon individual peculiarity as well as upon the length of exposure and degree of concentration of the gas.

It is difficult, or impossible, to tell how severe a given burn will be until the acute stage is over, and difficult to say when it is really over, until a week or ten days has elapsed after the wound has appeared to be healing; for a relapse may occur later.

4. The intensity of inflammation caused by the gas is evidenced by the great infiltration of the skin with yellow lymph, stained with broken down hemoglobin and coagulated into a solid mass resembling hard fat. These blebs invariably destroy the whole thickness of the skin and may go much deeper and tissue destruction may continue after their separation. Fluid exudates from them, or from under them, if allowed to remain in contact with the sound skin, may cause a serious lesion. In appearance and to the touch, the blebs resemble lipomata. Some of the beautiful wax models in the Army Medical Museum, made by Captain James F. Wallace, illustrate this in a striking manner.

5. During the acute stage there is burning pain, severe at times, even when the wound is covered with a bland dressing and at rest. But, when exposed, the lightest touch with a film of cotton, a drop of water, or even a breath of air, will cause severe pain. When the acute stage is past the raw surface is not sensitive. The extreme penetrability of the gas was well illustrated by Case II (appended). This young man was tightening a connection on a pipe leading from a tank of gas.

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*Read before the Southern Surgical Association, December, 1918.

He did not know that any of it had gotten on his skin. Thirty-six hours later, he began to burn and tingle not only on his left hand which had held the pipe, but all over his chest, abdomen and legs, and on the upper surface of his feet, although he had on high shoes and stockings when exposed. Fortunately all the burns were only of the first degree and healed in ten days except those on his left hand.

The burn on his hand, however, continued active for nearly three weeks and destroyed the whole skin on the dorsum of three fingers and between the fingers. Healing may progress rapidily in the superficial part of a burn at the same time that active destruction is going on in a deeper part.

Treatment. From my limited experience I should say that all blebs should be cut away with scissors and the sound skin and superficial part of the burn protected with a coat of ambrine or paraffin, after a thorough cleansing with sterile water and drying.

I found in my cases that a dressing of ambrine gave marked relief and that healing was more rapid under it than under any other dressing used. Wet one and one-quarter per cent. phenol dressing and the Carrel-Dakin dressing were used at times and the former apparently relieved pain, while the latter had a marked effect in dissolving stubborn sloughs and lessening discharge.

Case I. R. M., civilian experimental chemist, 24 years old, March 9, 1918, while doing experimental work for the government at the Catholic University, D. C., accidentally broke a container and scattered some of the contents of liquefied gas over himself. He immediately washed the exposed surfaces but did not remove his clothing until two hours later at bedtime. He did not think enough gas had got on his clothing to do any harm.

Nothing was noticed until sixteen hours later when itching, burning and pricking sensations were felt over the chest, abdomen and right leg. The next day vesicles appeared on the right thigh and wrist. They rapidly coalesced and formed large blebs filled with solid coagulated yellow serum.

He was sent to the Emergency Hospital and I saw him there at the request of Dr. George Ruffin and took charge of the case the eleventh day after the accident. He had been treated from the onset of symptoms to this time with compresses wet in sodium bicarbonate solution and twenty-five per cent. magnesium sulphate solution. When I saw him he had a deep burn on the flexor surface of the right wrist about one by two inches, large pigmented areas on the chest and abdomen where very superficial burns had been and a very large burn on the right thigh extending from the middle of the patella to two inches above Poupart's ligament, over the scrotum and head of the penis and more than half way round the thigh on the anterior aspect. The edges of the wound were superficial but gradually deepened toward the center until the whole thickness of the skin was destroyed at an average distance of an inch and a half from the edge. Sloughs had come off this part of the burn, leaving a red, granulating clean surface, but an area in the center about six by ten inches was covered by large blebs that looked and felt like fatty tumors after removal. These solidified blebs were still tightly attached and went through the skin and into the underlying muscle. They were trimmed off with scissors and the whole burn dressed with ambrine; ambrine dressings were applied every day or every other day for a month, and with occasional interruptions of a week when the Carrel-Dakin method was tried, these ambrine dressings were continued for five months.

The superficial portion healed rapidly and even portions where apparently the whole thickness of the skin was destroyed healed in a month without apparent scar. But a large area in the center originally covered by the blebs continued to form and shed sloughs for two and a half months, at intervals of about a week. This part of the wound consequently grew deeper and very irregular in depth. Parts of it ate into the muscles for nearly an inch. The discharge was free during the acute stage which lasted about three months and consisted mainly of coagulated lymph and serum. It was examined at intervals of a week but no organisms were found except on two occasions when the discharge became green and hay bacilli were found.

The patient on these occasions noticed the odor of hay, or dried apples as he called it. On several occasions epithelium which had accumulated around the edges was scraped off and scattered over the surface, where it began to form islands, but these islands came off with the sloughs.

Finally, when I was almost in despair, the sloughing ceased, granulation became rapid and numerous islands of epithelium became apparent and grew in a very satisfactory manner. These islands fused and cut up the large raw surface into several small areas. Healing was rapid and by June 10th was nearly complete. I left the city at that time for three weeks, expecting to find the cure complete on my return. But when I got back I found the raw surface larger than when I left and infected with bacillus pyocyaneus. A week's treatment with one-quarter per cent. phenol solution got it into healthy condition again. Ambrine dressings were resumed and by August 16th healing was complete. There was almost no perceptible scar, but much brown pigmentation. I attribute the lack of scar to the ambrine treatment. I have used it or paraffin on many bad burns and have been highly gratified to find little or no scar perceptible even where the whole skin had been destroyed. I have seen no difference in the result whether ambrine or parawax was used.

Case II. L. G. W., also an experimental chemist working for the government. He was burned in Cincinnati, about May 9, 1918, and treated in hospital there until May 20th when he came to Washington and I saw him first May 21st. He said he was tightening a connection on a pipe leading from a tank of gas, and did not know he got any of it on him until thirty-six hours later when he began to tingle and have a pricking sensation of the skin. In a few hours more vesicles appeared on his left hand and light burns of the first degree with a great amount of dark brown pigmentation appeared on his chest, abdomen, legs and even on the dorsum of each foot, although he was wearing high shoes. He could not say whether the gas penetrated the leather or filtered through the shoe tops.

When I saw him ten days after the first symptoms he had what I took to be a burn of the first degree over his whole left hand except the palmar surface. The yellow blebs appeared, however, a few days later and the whole skin was destroyed in the sulci between his fingers and over a large part of the dorsum of his hand and fingers.

I treated him for three weeks with ambrine. The sloughs came away and healing was well under way at that time, when he left the city for the west.

Case III. H. S., Lieutenant in the Army and experimental chemist. Had a burn about the size of a half dollar on forearm, made as a control in testing a protective dressing for the skin.

I saw it thirty-six hours after exposure. Vesicles had appeared. Next day two yellow blebs about half inch in diameter developed and left deep but small ulcers that took three weeks to heal.

Case IV. J. M., civilian chemist. Case almost identical with Case III.

AN ICE-PICK IN THE SPINE.

Case Report from the Clinic of

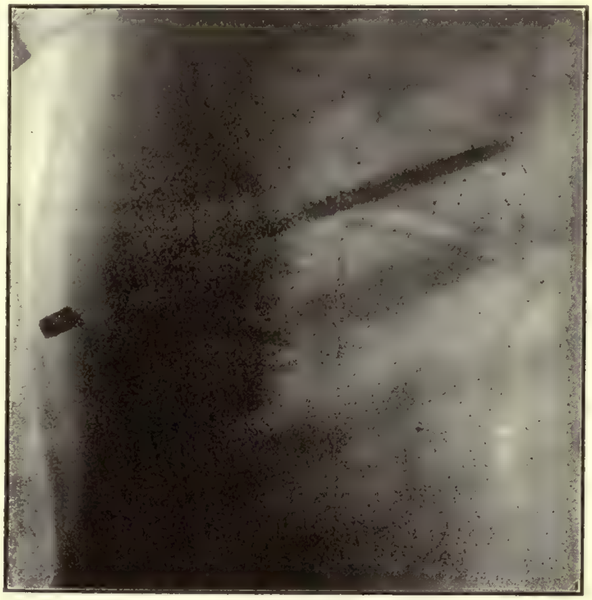
Elmer E. Francis, M.D., F.A.C.S.,

Professor of Clinical Surgery and Applied Surgical Anatomy, University of Tennessee,

Memphis, Tenn.

A female, thirty-one years of age, well developed and well nourished, suffering from a partial paralysis of the left leg, was admitted to the hospital with a punctured wound in the back. This patient had been in the hospital for more than a week; the interne thinking her case was a minor wound, had failed to report her to me until yesterday. The family and past history of the patient is of no especial importance, so far as the accident is concerned. The hospital records show she was here two years ago on the medical service and had a four plus Wassermann reaction. She remained only a few days and no diagnosis was recorded.

The history of the present accident is that at 4 A. M., January 6, 1919, she was struck in the back with an ice-pick. On examination a small punctured wound was found a half inch to the left of the spinous processes on a line with the inferior angle of the scapula. She was immediately partially paralyzed in the left leg, with pain radiating down the back of the left thigh. She had been up and around the ward dragging the left leg, until my attention was called to her yesterday. An *x*-ray picture was ordered. It shows very plainly about four inches of an ice-pick in the spinal column. The wound has about healed and shows a very slight infection which is superficial. Aside from the injury to the spine, the interesting points in this case are the size of the foreign body and its location, and the small amount of infection.



The patient being anesthetized, an incision is made over the original wound which readily exposes the end of the foreign body, firmly imbedded in the bone. It requires considerable force to dislodge it. An antiseptic dressing completes the operation.

Subsequent Note: The patient was up in the ward in two or three days, and left the hospital in ten days, showing slight paralysis of the left leg. After three months she reported perfectly well.

New York and New England Association of Railway Surgeons.

The twenty-eighth annual session of the New York and New England Association of Railway Surgeons will be held at the Hotel McAlpin, New York City, on Monday, October 20th, 1919. A very interesting and attractive program has been arranged. A symposium on "The Modern Treatment of Infected Wounds" will be presented by leading surgeons. Railway surgeons, attorneys and officials, and all members of the medical profession are invited to attend.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

New York, October, 1919

THE STETHOSCOPE OF LAENNEC.

While nations are grappling with the problems of tuberculosis, it is not out of place to pause in this year 1919 to consider one of the epochal discoveries which may be said to have laid the foundation of the modern study of this subject. Numerous surgical conditions which have as their etiological factor the bacillus tuberculosis, in a large proportion of cases are related to the development of pulmonary infection. The causative organism was discovered by Koch in the latter part of the nineteenth century, although the disease itself has been known from immemorial times. The great impetus given to the study of tuberculosis is intimately associated with the disease itself. A tuberculous son of a tuberculous mother, both of whom succumbed to the disease, were responsible directly and indirectly for the invention of an instrument most powerful as an agent in the campaigns to lower the mortality of the white plague. Next to the actual discovery of the bacillus of tuberculosis, the greatest event in connection with the historical development of our efforts to control its spread was the invention of the stethoscope in 1819 by Réné Theophile Hyacinthe Laennec. The first cylinder of paper which he employed gave birth to an instrument of precision and the art of auscultation. The publication of his paper *Traité de l'Auscultation Médiate* was the real beginning of our modern knowledge of diseases of the thorax and the methods of investigating them by mediate examination.

To Laennec humanity is indebted for his thorough correlation of the signs elicited through auscultation, and the corresponding pathological conditions giving rise to the auscultated sounds. To most persons, he is undoubtedly better known as the describer of the chronic diffuse interstitial hepatitis frequently termed "Laennec's cirrhosis." Such fame, however, while paying tribute to his skill as a pathologist and clinician, fails to give him the meed of honor which he deserves as a leader in the differentiation of conditions within the thorax. The descriptive terms now so familiar to those studying pulmonary conditions were created by him, and when we speak of râles, pectoriloquy, egophony, we employ terms given to the world by Laennec.

The stethoscope invented one hundred years ago, was the main factor in unraveling many of the mysteries of diseases of the thorax. While the accomplishments of Auenbrugger along the lines of percussion had advanced pulmonary diagnostics, the basis of differentiation of numerous diseases awaited the application of Laennec's ear to his simple stethoscope. He it was who decribed and differentiated bronchiectasis, pneumothorax, hemorrhagic pleurisy, pulmonary emphysema, and pulmonary gangrene. In many ways it may be said that the Breton internist was the main figure among the numerous historic clinicians, who established upon a firm basis the diagnostic criteria of cardiac and pulmonary diseases.

Today the stethoscope is an essential instrument of modern medicine. A knowledge of its use is requisite for every one who honestly seeks to familiarize himself with the normal and abnormal sounds generated within the human body. It is an essential to medical science and art. The part it has played in the history of pulmonary diseases is second to none. The various facts ascertainable through its use have gone far to enable the early diagnosis of tuberculosis. It has been of the highest service in enabling this dread disease to be discovered in its incipient stage. The probable decrease in mortality from tuberculosis is largely attributable to the detection of the disease in its early stage. The decline in the number of surgical complications and sequelae is similarly closely related to more expert diagnostication through the use of the stethoscope.

The surgeon with his exploring needle or scalpel possibly lays less stress upon the employment of the stethoscope than is merited by the value of the facts which it suggests or reveals. Possibly greater attention is given to percussion than to auscultation because the fingers are always with the surgeon, while the stethoscope is more likely to be in the office. Nevertheless, immediate auscultation is of primary importance in the differentiation of intrathoracic diseases, when the stethoscope is not at hand.

The medical historian or the student of modern preventive medicine, called upon to indicate the effective devices for diagnosis sufficiently practical to be of immense service in lessening the fatality of diseases, would unhesitatingly class the invention of the stethoscope in 1819 as of paramount importance, and little less valuable than the discoveries of Koch, Pasteur, and Lister. From the surgical point of view the investigations of the last named would stand forth as the crowning glories of a century, because of their revolutionary effect upon surgical practice. From the viewpoint of humanity as a whole, however, it is probably not incorrect to state that the general effects of Laennec's invention have been productive of greater benefits than the results of the valuable discoveries of any one of the others mentioned, though probably not so great as the advance in public welfare resultant from their combined activities.

It is not unfitting that the centenary of the stethoscope be duly honored, and that our medical brotherhood should give a grateful thought to the memory of him who contributed it to the world.—I. S. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

RESPONSIBILITY FOR ABDOMINAL HERNIAE.

We have vigorously protested in these columns (The Journal, June, November, 1915) against the view—universal among the laity and still far too common in the profession—that the familiar abdominal herniae (inguinal, femoral, umbilical) arise from "accidents," such as "strains," falls or ordinary blows; and we have called attention to the unfair burden that such a view (for which the unfortunate term "rupture" is perhaps largely responsible) puts upon accident insurance companies and upon all those who bear the costs of "Workmen's Compensation Acts."

It is not necessary to repeat the arguments that condemn the unscientific and ignorant aspect of hernias that still largely prevails among insurance companies and in the courts; nor need we further quote other writers in support of our contention. We believe that most thinking surgeons will admit that the abdominal herniae, whether found congenitally or developing late in life, arise from a preformed anatomical defect; that a straining effort or a fall can operate, at most, only to fill or to distend an already existent sac or to increase an unnoticed protrusion ("direct" inguinal hernia); that only the rare cases of protrusion through a severely crushed or perforated abdominal wall can properly be styled traumatic or accidental herniae.

It seems curious that what is so clear to those who are most familiar with the subject should have failed of general recognition, that in our courts of law and among insurance companies "ruptures" still pass as accidents. It is, however, encouraging to observe from time to time that the truth is slowly gaining ground and that even some of our lawmakers are getting an inkling of the truth that an abdominal hernia is not an accident but a "disease."

Industry should be freed from the responsibility, under Workmen's Compensation Acts, for herniae developing during employment. Whether or not industrial organizations should assume the cure of such herniae and thus restore the individuals to full working capacity, is an economic problem that has a wholly different basis. In this connection, and from the standpoint of "compensation" responsibility, it may be interesting to quote here some passages from an artcle on "Hernia in Industry," by Charles A. Lauffer, medical director of the relief department of the Westinghouse Electric and Mfg. Co., which appeared in *The Journal of Industrial Hygiene,* August, 1919:

> The acquired hernial sac arises slowly, because the peritoneum is a tough, resistant membrane, and can not be pushed out to form a sac by any single impulse. This is readily demonstrated on the cadaver; no finger is strong enough to push out the peritoneum suddenly at the internal ring.
>
> * * * * * *
>
> Just as a house is a house before it becomes tenanted, even so an empty hernial sac constitutes a latent hernia, before the said preformed hernial sac acquires contents.
>
> * * * * * *
>
> An acquired hernia is a disease. The acquired hernia is popularly confounded with true traumatic hernia to so appalling an extent that more cases of alleged traumatic hernia have been awarded compensation in Pennsylvania (exceeding 4000) than there have occurred cases of real traumatic hernia in the western hemisphere since Columbus discovered America [!] Other commonwealths have

been as notorious in awarding compensation for acquired hernias, pathological in type, which are in no sense true traumatic hernias.

* * * * * *

For the truly traumatic hernia, the employing industry is undoubtedly responsible under the Workman's Compensation Act, but less than one hernia in a thousand is of this type, hence, the 999 constitute a burden imposed by law on industry.

* * * * * *

Hernia interferes with production. The employee with hernia can not put his native energy into the work; in lifting, pulling, and pushing, he does not do his share, but is disposed to shirk; he always wants to be placed on some easy job, where he will not have to work hard. The patient with hernia has difficulty forgetting himself in his work.

* * * * * *

Where a reasonable presumption exists that the employee's hernia has arisen in the course of his employment, our company accepts the patient's viewpoint and repairs the hernia without expense to the employee.

* * * * * *

Operating practically all hernias that arise does not constitute an acceptance of liability for the payment of compensation benefits.

* * * * * *

We are convinced, moreover, that performing herniotomies for pathological hernias should be regarded as a gratuity on the part of the industries, calculated to restore faithful employees to industry and, at the same time, as a patriotic duty by which industrial workers are restored to their greatest efficiency. W. M. B.

Progress in Surgery

A Résumé of Recent Literature.

Infective Hemorrhages from War Wounds. HAROLD NEUHOF and FORDYCE B. ST. JOHN, New York. *Surgery, Gynecology and Obstetrics*, August, 1919.

Neuhof and St. John present 45 cases of so-called secondary hemorrhage from war wounds. They prefer the term infective hemorrhage rather than secondary hemorrhage, because in practically all cases of war wounds showing late hemorrhage, the infectious process is present, and can often be pathologically shown invading the arterial wall. In all specimens of arteries resected for infective hemorrhage, the rupture was an oval defect or elliptical defect, lying in the long axis of the vessel. The margin of the defect was often smooth and rounded off, shaggy in other cases. Thrombi in the lumen were occasionally observed. The authors present a detailed study of the pathological condition of the arteries involved, showing the invasion of the infective agents. Many types of bacteria were found, but they could rarely be demonstrated in the muscularis except at the site of rupture. There is often associated a fatal vein infection, or suppurative thrombosis of the adjacent veins. The treatment is mainly prophylactic. Conservative measures, such as packing are dangerous even in the slighter cases. Amputation is indicated for most cases of hemorrhage from the popliteal or posterior tibial artery. The main artery should be tied off in a non-infective area. Where amputation is not indicated, it is better to resect the artery through an incision above the source of hemorrhage, preferably in a non-infected area. The authors call this the "surgical approach." The veins, unless they are important trunks, should be resected at the same time.

The Treatment of Metastatic Carcinoma of the Spine by Deep Roentgenotherapy. GEORGE E. PFAHLER. *Surgery, Gynecology and Obstetrics*, September, 1919.

The author presents four cases of metastatic carcinoma of the spine treated by roentgenotherapy. From his observations in these cases, he feels warranted in presenting the following conclusions:

1. The roentgen-rays when applied properly and in sufficient quantity upon deep-seated cancer tissue, may be expected to destroy the cancer cell, and this cancer cell is replaced by healthy scar tissue or fibrous tissue.
2. As a result of this healing process, the patient's life is prolonged and he is made more comfortable.
3. One cannot expect the patient to make a complete, permanent recovery, for ultimately the disease is apt to show metastases particularly in the areas not treated.
4. It is entirely likely that these metastatic carcinomata of the spine, without other evidence of metastatic involvement, have an unusual amount of natural resistance, and that this increased resistance on the part of the patient helps us greatly in the healing process. It seems likely that many of the patients, or most of them, die of visceral involvement, before there is time enough for symptomatic disease to develop in the spine, and so it is only in more resistant cases that there is time for spinal metastasis.
5. With the clinical and microscopic proof of the destructive action on malignant tissue followed by a healing process, and with the experimental proof of a decrease in malignancy of cancer tissue, which has been exposed to the *x*-ray, and a decrease in its capacity for inoculation, we can recommend most strongly the use of deep roentgenotherapy both as pre-operative treatment to be followed immediately by operation, and as post-operative treatment, given after the proper interval, which should be four weeks after the pre-operative treatment.

Chronic Septic Inflammation in Bone Following Gunshot Wound. W. E. GALLIE, Major, C.A.M.C. *The Journal of Orthopedic Surgery*, August, 1919.

Gallie reviews the older and modern methods of treatment of bone sepsis and chronic osteomyelitis. From previous knowledge and from experiments in bone repair and bone infection in animals, the author presents the following conclusions as regards the mechanism of bone repair and the treatment of bone infections:

1. The periosteum is the medium by which the blood-vessels are distributed to the shafts of the bones. Reflection of the membrane produces superficial necrosis and should never be done when sepsis is present or feared.
2. The periosteum as reflected in an ordinary surgical operation is merely a fibrous tissue membrane and is not osteogenetic. It should therefore never be relied upon to restore the shaft after resection.
3. Mild chronic septic infection is a strong stimulant of inflammatory osteogenesis. It causes widespread osteoporosis, increased vascularity, and abundant callus-formation. This is the state in which cavities are most apt to heal, and fractures to unite, unless prevented by some definite condition such as the presence of sequestra or the existence of too large a gap.
4. When the irritation subsides or disappears, this rarefying osteitis gives place to an intense sclerosis which is very inimical to the healing of cavities or fractures.
5. Treatment should therefore take advantage of the pathological condition which is present at the time the sequestra have separated, and aim at a complete cure before osteosclerosis has supervened. It should consist of the complete excision of the scar and sinus, and the wide removal of the walls of the cavity for the purpose of thorough evacuation of sequestra and unhealthy granulation tissue. All irregularities and pockets must be obliterated, and when possible the depth of the cavity should be reduced by allowing the soft structures to fall into it. Pedunculated muscle- or fascia-flaps are of great assistance in promoting rapid healing. Finally, wide-open drainage must be provided so that the cavity can heal from the bottom without depending on the dangerous alternative of a narrow sinus.
6. Taylor's apparatus is useful in cleansing these wounds before operation and is of great value in the treatment of post-operative sepsis.
7. Non-union in compound fractures, uncomplicated by great loss of bone, is rare. When present, the fact that the wound is septic is no contra-indication to active treatment of the fracture, as well as of the osteomyelitis. Gratifying results may be anticipated from thorough freshening of the ends and adjusting of the fragments, providing efficient drainage is secured.
8. The best time to correct mal-union in septic cases is at the time of the operation for the disease in the bone.

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A PLEA FOR CHLOROFORM.*

WM. B. HOWELL, M.D.
Late Major in the C.A.M.C.
MONTREAL, CANADA.

The pendulum of medical opinion generally swings from one extreme to another before coming to rest in the position which experience ultimately justifies. This is particularly true regarding chloroform. From being used too much it has, in many clinics, especially in this country, been completely abandoned. In others, it is used so rarely, that those who are called upon to administer it, however proficient with other anesthetics, have not the experience necessary to use it to the fullest advantage. It is an easy step from using it only occasionally to forgetting its existence altogether. No doubt ether or nitrous oxid and oxygen can be used for every type of case requiring general anesthesia, but this does not prove that in certain conditions chloroform will not be found more useful than either. We must not be content with *good enough* but only with the best, and if we are to attain this we must define exactly the sphere of its usefulness.

CHLOROFORM IN WAR SURGERY.

The war will have put chloroform in a new light to many of those who gave anesthetics in the Military Hospitals abroad. Whether from climatic conditions or a difference in the quality of the ether supplied, or possibly owing to the special type of patient, most of them being given to smoking cigarettes to excess, ether alone was not as satisfactory as it is in this country and many anesthetists were glad to turn to the free use of chloroform. It is not intended to suggest that there is any serious tendency to establish chloroform as the routine anesthetic in these northern latitudes, but a certain familiarity with it having been obtained, it will be realized by many of us that we have allowed it to fall into somewhat unmerited neglect. It is undoubtedly more dangerous than ether, and therefore the less it is used by those who only occasionally give anesthetics, the better. It is for those who are qualified by experience with other anesthetics and whose ambition it is to reduce to the utmost that part of the suffering of the patient which may be referred to the anesthetic, to make judicious use of an agent which in its proper sphere is in the highest degree useful.

The majority of soldiers who came to operation were only slightly wounded and were, apart from the wound, in excellent physical condition. They were highly resistant to ether employed alone and very frequently shouted and struggled. Even after his return to this side of the Atlantic the soldier requires more ether than the average civilian.

Where the necessary equipment and supplies can be obtained in Military hospitals, the difficulties in inducing anesthesia with ether can be overcome by the preliminary use of nitrous oxid or ethyl chlorid. But where there is a large number of soldiers to be anesthetized, nitrous oxid and ethyl chlorid may not be obtainable, and then the value of chloroform becomes most apparent. It is, of course, better that ether should be used when the anesthetist is inexperienced and perhaps not particularly interested in this work, but with care and skill the dangers of chloroform can be reduced to a minimum, with a great saving of time and discomfort.

THE VALUE OF DOSIMETRIC ADMINISTRATION.

One difficulty in appreciating the significance of a death under chloroform is the lack of particulars given in reports as to the experience of the anesthetist and the amount of care taken by him. If he is carelessly pouring unknown amounts, at irregular intervals, on a cotton mask, and part of his attention is directed to watching the operation, he can do an astonishing amount to give choloroform a bad name where it may really not be merited.

It seems reasonable to require that with so potent an agent as chloroform, we should be able to control exactly the amount the patient is getting and that we should be able to evenly increase the dosage during the period of induction and continue it uniformly during the period of maintenance. These requirements can be attained by the use of a dosimetric inhaler such as that devised by Vernon Harcourt. When giving chloroform on an open mask, one is often made uneasy by symptoms of apparent danger and is at times puzzled to know just how deeply the patient is anesthetized. When using the Vernon Harcourt inhaler in France I was greatly struck by the absence of these symptoms and I was very rarely, if ever, in any doubt as to the depth of anesthesia. It is not enough, however, to use a dosimetric inhaler to ensure absolute safety. There have been deaths with it even in skilful hands, but it is undoubtedly a means to eliminate part of the danger. Levy's investigations of ventricular fibrillation as the usual cause of death under chloroform are worth the most careful study. The evidence he adduces to prove that the most dangerous time is that of light anesthesia is too strong to be ignored. It should teach us to hasten, as far as possible, the stage of induction, to insist that there is no hurry in commencing the operation, and to resist the temptation to keep the anesthesia as light as is consistent with keeping the patient quiet.

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*Read during the Seventh Annual Meeting of the American Association of Anesthetists, at The Breakers, Atlantic City, N. J., June 9-10, 1919.

Hewitt in his directions as to the use of the Vernon Harcourt inhaler says: "It is generally found that beginning with the pointer at .2 and moving it toward the chloroform bottle at the rate of one division about every half minute up to 1.6 and 1.8 produces narcosis as quickly as is desirable." By following these directions it will take from 3 to 3½ minutes before the patient is breathing vapor containing 1.6 or 1.8 per cent. of chloroform. In view of Levy's work it seems safe to push the indicator up to 2 and give a vapor of 2 per cent. by the end of a minute, and this can be done without discomfort to the patient.

In line with Levy's theory is the fact that where chloroform is used as the routine anesthetic it is always given lavishly and there is a comparatively low death rate.

THE CONCOMITANT USE OF MORPHIN, OXYGEN AND WARMED VAPOR.

It is not only fear upon the part of the patient which predisposes to death under chloroform but fear upon the part of the anesthetist. *Levy's statement that atropin by throwing the vagi out of action predisposes to ventricular fibrillation, should be borne in mind. There is not the same need for atropin with chloroform as there is with ether, as there is not the same excessive salivary secretion.* It seems reasonable, however, to use morphin alone as it lessens fear and struggling.

Gwathmey has urged the importance of using oxygen with chloroform. Since the blood leaving the lungs, when ordinary air is breathed, is nearly saturated with oxygen, lacking only one volume per cent. of complete saturation, it is hard to see how an extra 1 per cent. can make much difference except in the case of patients whose respirations are feeble or obstructed. Physiologists deny that breathing pure oxygen has any effect on oxidation in the resting body. Possibly, however, it may have some effect apart from oxidation. *In certain cases where abdominal rigidity persists under deep ether anesthesia with a good color, the breathing of oxygen will often produce quick relaxation.*

Gwathmey also states that warming chloroform vapor enhances its safety. Whatever the method of administration, except in the case of intratracheal or intrapharyngeal insufflation, the inspired air with its contained vapor has been warmed to the temperature of the body before it reaches the alveoli of the lung where absorption takes place. If the patient is breathing through his nose the inspired air is warmed to the temperature of the body before it even reaches the glottis. It is difficult to see how the act of warming air laden with 2 per cent. of chloroform or less by the nose can be detrimental to the body. In the case of ether it is certainly possible to deliver ether vapor at or below the temperature of the room through an intratracheal catheter without the type of anesthesia being apparently different from that due to warmed vapor. If there is any advantage in warming chloroform, may it not be due to some chemical change caused in the chloroform by the heat? Recently the work of Cotton of Toronto on the chemistry of ether has opened up new possibilities. May it not be that somewhat similar discoveries may be made in connection with chloroform? We must not forget the importance of using only chloroform made by a reliable firm, since undoubtedly impurities may be contributing factors to bad after effects and possibly fatalities, and to keeping it under conditions which will prevent its decomposing.

SPECIAL CONDITIONS JUSTIFYING THE USE OF CHLOROFORM.

Some of the conditions under which the use of chloroform is fully justified are:—

1. *In Military Surgery as specified above.*
2. *In the Tropics.*
3. *In Obstetrical Cases to dull the Suffering during the Pains.*

At first sight it would appear that according to Levy's theory, there are in obstetrical cases the special factors which produce ventricular fibrillation—periods of light anesthesia with strong painful stimuli, but experience has proved that the danger in labor is very slight. So far no satisfactory explanation of this safety has been advanced.

4. *In Cleft Palate Cases in Infants and Very Young Children.* At the best these are very difficult cases for the surgeon and the results are often unsatisfactory. The absence of the excessive salivary secretion due to ether and the lessened vascularity increase the chances of the operation being successful and compensate for a slightly increased risk.

In young children it is usually recommended to commence ether with chloroform. This practice is by no means without danger. One occasionally sees, even after the change to ether has been made, a very marked pallor with feebleness of pulse and respiration. When chloroform is used in this way the change to ether should be made at a very early stage.

5. *Affections of the Respiratory System.*

(a) *Pulmonary Tuberculosis.* Nitrous oxid and oxygen are generally recommended for these cases.

In these days of extensive operations on consumptives for abdominal tuberculosis, there is often difficulty in getting sufficient relaxation. This can often only be obtained by adding chloroform or by using it alone. Moreover, nitrous oxid oxygen in some gas machines is breathed under more or less strong positive pressure from distended rubber bags. It is by no means certain that this distention of the alveoli by pressure may not affect the diseased lung unfavorably. These patients usually stand a prolonged chloroform anesthesia very well.

(b) *Emphysema and Asthma.* Patients with these conditions, if they are at all marked, undoubtedly do best with chloroform.

(c) *Coryza.* A patient with a cold should not be given ether. In cases of pneumonia following operation within a few days, it is astonishing how often one finds that the patient had a cold at the time of the operation. If the operation cannot be deferred, gas or chloroform should be used.

(d) *Empyema.* When the collection of pus is large and there is bronchitis, these cases should be done under local anesthesia, but if a general anesthetic becomes necessary chloroform seems often to be more satisfactory than nitrous oxid and oxygen, as there is less strain thrown on the lung. Where the collection of pus is small and the bronchitis slight or absent, ether or nitrous oxid may be given.

(e) *Obstruction to Respiration,* either by pressure from without, as in Ludovic's angina, or by growths inside, as in papilloma of the vocal cords, chloroform is especially useful. In the latter condition in young children the space for the passage of air is extraordinarily small, and only by the most careful use of chloroform can a satisfactory anesthesia be obtained. It is in such cases as these that the use of oxygen with chloroform is of undoubted value.

7. In strong muscular men for the *reduction of a dislocation or the setting of a fracture,* quick relaxation can be obtained by means of chloroform with very little disturbance or discomfort to the patient.

8. It was formerly held that chloroform was the best anesthetic for brain cases associated with increased intracranial tension. Experience has shown, however, that ether is much safer.

In conclusion, we must remember that though chloroform, like the surgeon's knife, is a dangerous weapon in the hands of the unskilful, we are entitled to use it only so long as we bring to the use of it a full sense of the responsibility we are assuming and the utmost degree of skill which we possess.

GROSVENOR APTS., SHERBROOKE ST.

EXPERIENCES OF AN ANESTHETIST AT THE FRONT.*

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As the title of my paper suggests, it is not to be a technical discussion but more of a random recital of some of my observations and experiences while on duty at various hospitals in the war zone in France. It was my good fortune to serve with hospital units both behind the English and American lines and also with the Australians. Thus I had exceptional opportunities for observing and contrasting the methods of the different organizations. But since comparisons are odious, I refrain from going into detail with reference to my impressions along these lines. I will, however, allow myself to say that we Americans did not possess all the good things and that from the standpoint of thoroughness and efficiency we had much to learn from our Allies, in the field of hospitalization.

THE PROBLEMS OF A MILITARY HOSPITAL.

The problems of a military hospital are not quite the same as those of a well organized civilian institution of a similar character. The difference is more manifest the nearer the scene of actual hostilities the former is situated. In a large general or base hospital conditions more nearly approximate those of the hospitals with which we are familiar at home. As far as possible the equipment is more or less ample; there is a sufficient personnel with which to "Carry On," and the group of workers composing the staff is well organized; while the close proximity to the base of supplies usually assures one an abundance of things to work with. However, a Casualty Clearing Station or an Evacuation Hospital is greatly hampered by a certain lack of these things. This is even truer still of a Mobile Hospital or a Field Hospital. There thorough organization and discipline and a proper "esprit de corps" go a long way in atoning for the lack of some of the things referred to. The Commanding Officer, Chief Nurse, or Matron, and the Quartermaster of such a hospital hold positions of great responsibility. My experience has been that, as a rule, those chosen for these executive positions were selected with great care. It is fortunate that they were, for the welfare of the wounded soldier lies very largely in their hands, strange as it may seem. Their responsibility in reference to the successful conduct of the Hospital in its practical workings may be compared to that of the General and his Staff who plan a campaign against the enemy. In both cases executive ability of a high order, vision, foresight, and an abundance of common sense and good judgment are essential.

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If those in charge of the hospital are not big enough for the job when a time of crisis arrives, no matter how willing and efficient the operating surgeons, nurses, and orderlies may be, they will not be able to minister as they should to those they must serve. I know that this sounds trite, nevertheless it is true.

THE C. O., MATRON, QUARTERMASTER AND PADRE.

The C. O. can and must shift much of the responsibility onto the shoulders of his staff. Still he is the one who is held responsible and to him everyone looks for direction and inspiration. I shall never forget those busy, trying days during August and September, 1917, at No. 10 British C.C.S. in Flanders where the wounded from the battlefields beyond Ypres were being brought back in such numbers that we, with our limited staff, were literally swamped. There was scarcely any opportunity for sleep for days at a time. Through it all the Colonel in command was always on the job. At any hour of the night or day you would find him and his Sergeant-Major, who always accompanied him, in the wards, in the receiving tent, in the operating room, everywhere in fact, it seemed to us. Not a thing escaped his watchful eye. He had a word of encouragement for everyone, so that, in spite of the long hours, the fatigue and the nervous strain of our work, to say nothing of the depression caused by the sight of so many thousands of mangled bodies, he kept us "up on our toes" turning out the work and all in a fine spirit of harmony until the attack was over, and we could get an opportunity for a brief rest.

The same was true of the Matron and her supervisors. The wounded and gassed men were well and tenderly cared for, and as quickly as possible after operation, evacuated by ambulance train back to the Base Hospitals. She knew just how to get the best cooperation among her staff of nurses and she set them all a fine example of tireless energy. The Matron of a British Military Hospital holds a position of more than ordinary importance, and as a rule she is not the last one to be aware of the fact. Even so, these splendid, capable women are generous and large hearted and altogether human. Many a wounded lad lives today to thank them for their kindness and thoughtfulness. Their opportunities were many for supplementing the care of the overworked ward nurses and I assure you they made good use of these opportunities.

Not by any means of least importance was the Quartermaster. It was to him we looked for our supply of dressings, splints, medicines, and even our daily bread. His was no easy task, as you may well know, with our nearest base of supplies many kilometers away and transportation facilities very much overtaxed. To his credit, let me say that during all those feverish weeks we lacked no good thing. And I must not forget the Padres. It was their privilege to go from bed to bed in the long wards, cheering up the living, taking the last messages and closing the eyes of those who were not able to survive. writing the home letters and each morning leading the lonely cortege of flag-draped bodies which wended its way to the ever-enlarging God's Acre, where was laid to rest all that was mortal of those who had "given their last full measure of devotion" to save the world from the scourge of German "Kultur."

I have tried to sketch hurriedly a picture of some of the activities of a Hospital in the advanced zone and to give you some idea of its organization. I will not inflict on your minds any of the harrowing details which were constantly transpiring before our eyes or of the atmosphere in which we lived for days at a time. Even if I made the attempt you could not understand. I only wish that you might have *seen* a little of it. Just enough to give you some conception of the results of the fiendish and jealous hatred of the Hun who, for no other reason whatever than a selfish, bigoted, insatiate greed sought to destroy and cripple and ruin France and Belgium that he might prosper at their expense. History will ever record his crushing defeat and bitter disappointment and let us be thankful that we, as a nation, had a part in bringing this about.

THE ADVANCED HOSPITALS.

Let us look now for a moment at one of these advanced hospitals from a physical standpoint. Whether British, French or American they were very much alike. Usually situated on or near a line of railroad for convenience of transportation of patients and supplies they were either under canvass or in huts. More often they were a combination of both. The huts had wooden floors, while the tents used as wards perhaps had tarpaulins under foot or more commonly only the bare earth. When of the latter, at first it was of grass and turf but in a country like France or Flanders where rainy weather is more than common, it soon became a mass of trampled mud. The various huts and tents were connected by wooden duckboards and walks. The outer edges of these walks were whitewashed to guide the stretcherbearers at night so that they would not fall off while carrying their wounded comrades. This precaution was necessary as no lights were permitted out of doors and all windows were kept darkened through fear of the Boche airmen. An additional precaution were the large red crosses painted on the roofs of the huts in order to indicate to the Hun, during the day, that that particular group of buildings was a hospital.

For beds, we used wire spring cots, stretchers, or rude wooden bunks, as conditions permitted. There was usually a generous supply of blankets. Sheets and pillow cases were luxuries, but as a rule obtainable. How the boys did appreciate being tucked in between clean sheets after weeks in the mud and filth of the trenches! The laundry problem was a serious one. The oiled linen had to be sent miles to the rear. When our Army adopted from the French the Mobile Hospital Unit, this item was greatly simplified. Each Unit carried with it on two large, specially built camions, a portable laundry outfit, the motive power being supplied by the engine of the camion or motor truck. There was an *x*-ray outfit similarly equipped, also a splendid sterilizing apparatus. In fact, an entire hospital on wheels, wonderfully compact and complete.

IMPORTANCE OF X-RAY AND FLUOROSCOPE EQUIPMENT.

The *x*-ray equipment was a most valuable adjunct to the military hospitals "over there." We could have scarcely carried on without it. Prior to operation, radiographs were made of practically all wounds in order to determine the location of bullets and shrapnel and to give the surgeon the proper knowledge of the extent and seriousness of fractures. And let me say in passing, it is remarkable what destruction of osseous tissue a very small fragment of metal can produce. It is almost unbelievable.

We perhaps never appreciated the true value of the *x*-ray in war surgery as we did at one of those front line hospitals where we were stationed which lacked this important item of equipment. The surgeons, of necessity, had to work, as it were, in the dark and many wounds could not be properly cared for because of the fact that we had no *x*-ray outfit. As a consequence, much more extensive excision of tissue was necessary. Even with good radiographs it frequently is next to impossible to find some of the smaller fragments. It was here that the fluoroscope proved invaluable.

The patient, anesthetised, would be taken into the dark room, placed upon the table and by the aid of the screen, the foreign body could readily be seen. If it were a chest case, oftimes the piece of metal could be seen imbedded in the respiratory muscles, or in the moving lung tissue perilously near the heart which, "like the little old Ford, ran right along." Wherever it was, the surgeon, deftly introducing his forceps through an incision previously made and guided, not by his sense of touch but by sight, would approach, grasp and remove the foreign body, thereby saving much valuable time and useless cutting. The Roentengenologist thus rendered a signal service in the hospitals during the war.

THE UNTIRING DEVOTED NURSING STAFF.

To the untiring, devoted services of our nursing staff much of the ultimate success of our efforts was due. Hats off to our splendid American Women who went "over there" enduring uncomplainingly all the discomforts and hardships incident to life behind the fighting lines. Many of them braved bombs and shells and poison gas as courageously as any man. I know whereof I speak, for I have seen them calm, cool and collected going about their duties, forgetful of themselves while the atrocious inhuman Huns were shelling and bombing the hospital full of desperately wounded men. Not only men, but women, gave their lives freely over there for the cause of righteousness and humanity.

The saddest sight I witnessed, in all my experience in France and Flanders, was the laying away of the cold form of a brave nurse who had fallen at her post of duty, killed by a German shell. This occurred at an Australian Hospital located almost in sight of the ruins of the once splendid city of Ypres. It was only by a miracle that several other nurses escaped the same fate. Here was an exhibition of the finished work of the detestable, Kultured Hun. Day and night our nurses worked, month after month, caring for our sick and wounded boys—yes and for those of the enemy as well, as our hospitals frequently contained wounded prisoners. To their splendid skill and kindly sympathy is due the fact that so many of our boys came back from France. We all recognize the value of good nursing. It is ofttimes half the battle and a big half at that. Our nurses and our well-trained orderlies greatly supplemented the professional skill of our medical officers. Indeed, to the sorely wounded, homesick boy, far from those he loved, these noble women brought a touch of home. Their cheery smiles and their sympathetic kindness, as well as their skill as nurses, no doubt kept many a lad from giving up the fight and "going West." To them also, fell many of the hard, menial and unpleasant tasks and they deserve all the praise that we can give them.

THE ANESTHETIST'S PART IN THE GREAT WAR.

But, do I hear someone asking, "where does the anesthetist come in?" "When his grandchildren ask him what he did in the great war what reply will he be able to make?" I have purposely mentioned first the other members of the hospital staff and attempted to show how valuable were their services in the great scheme for caring for the men who so fearlessly and courageously made of their bodies a living barrier to the progress of the brutal German hordes. They, one and all, in their respective fields, rendered indispensable service. Yet none of them, from a humanitarian viewpoint, excelled those men and women who deftly and skilfully soothed into unconsciousness the wounded men prior to their undergoing the operations which were so necessary in the saving of life and in ultimately returning numbers of them to the fighting lines. Operations which it would have been well-nigh impossible to endure had the men not first been anesthetised.

Yes, the anesthetist played a most important role in our military hospitals and everywhere I found the finest spirit of cooperation between them and the surgeons. Theirs was not a spectacular task. However, it was a most valuable one, and ofttimes carried on amidst great danger. One whom I knew paid the supreme sacrifice while at his post of duty as an anesthetist. Another, a women, for her coolness and steadfastness in time of great personal danger was decorated by the British authorities.

In our American Army, the greater number of aneshetists were especially trained men and women. On the other hand, in the British service where I spent the larger part of my 23 months overseas, the anesthetizers were M. O.'s who were assigned to that particular duty. However, toward the close of the war we trained at our hospital several British nurses in the use of both gas-oxygen and ether. This was done at the request of the British war office in order that these trained anesthetists might relieve medical officers for duty with battalions at the front.

THE ANESTHETIC AGENTS USED.

This brings me to the question of what anesthetic agents were generally employed. *Ether,* of course, was given first place because of its convenience and comparative safety, combined with the fact that its use does not entail the employment of a cumbersome apparatus. The Scotch surgeons preferred ***chloroform*** and this was used almost exclusively in some hospitals with excellent results. As far as I could learn its use was not general in American hospitals. Ethyl chlorid and Somnoform were employed considerably in the British service, particularly for operations of a minor nature. One prominent anesthetist from Melbourne, Captain Hornabrook, used the latter almost exclusively in his clinic with very satisfactory results, as he told me. During the summer of 1917 while in Flanders at No. 10 British C. C. S. and at No. 3 Australian C. C. S. I employed chloroform to induce anesthesia and then substituted ether for the remainder of the narcosis.

The British objective that summer and autumn was the strategically important Paschaendale Ridge, beyond Ypres. The fighting was fierce and sanguinary. It lasted for weeks and our losses were apalling as were also those of the enemy. With the wounded streaming back day and night by the hundreds, time was an important factor. Every minute counted and I found this preliminary use of chloroform very advantageous. It was by far more pleasant to the sense of smell of the patient than ether and much less irritating if, in addition to having been wounded, the man "had had a touch of gas. "Often, in such slightly gassed cases, I employed chloroform throughout. We were dealing with young men of fine physique and the results were quite satisfactory. Back at the Base Hospital we invariably administered nitrous oxid and oxygen to such cases.

Ether-oxygen was another favorite method in the more or less serious cases. There was a fairly abundant supply of oxygen provided and by attaching a cylinder of it to a Shipway apparatus a very pleasing result was obtained. It seemed to stimulate the heart action and anesthesia was maintained with an excellent color and full deep respirations. Our supply of N_2O was quite restricted and the only apparatus at hand was an antiquated Hewitt which was operated by means of valves turned by one's foot. The tubing and attachments were imperfect but still by dint of much care and watchfulness, both of the apparatus and the patient, a fairly good anesthesia could be maintained. This I reserved for the most serious cases and I was thankful to have even such a makeshift on occasions. Without it, many of the men who were in a condition of severe shock through injury and great loss of blood would never have survived. For the chest and abdominal cases it was a life saver.

N_2O and O would have been the ideal anesthetic for all cases and a great conservator of the time but in a forward zone hospital the bulky apparatus and the difficulty of securing and transporting the heavy cylinders made its use on a large scale almost out of the question.

However, one of our operating teams, when going to Flanders, did take with them a number of cylinders and an American made apparatus which they used to great advantage. The compactness of this outfit, the skill with which it was used and the excellent results obtained were a revelation to the British surgeons. As a consequence, I understood that an order was placed for several American outfits for use in their hospitals.

Our own Army, through the Red Cross, later brought to France and installed a complete plant for the manufacture of N_2O and oxygen. It was not in full running order until near the end of the war, however it supplied large quantities of N_2O and O to various army hospitals. Contracts had been let for the purchase of great numbers of apparatus and many had been delivered and were in use. Our wounded boys were ultimately to have been given all the advantages of this safest and best of all general anesthetics. By its use, no doubt, much post-operative pneumonia was prevented. This was particularly true when practically every patient coming to the hospitals from the mud and exposure of the trenches during the colder months was already suffering from bronchitis.

METHODS FOR CERTAIN SURGICAL PROCEDURES.

Where we had to deal with penetrating wounds of the chest we often found the use of chloroform very satisfactory. Ether alone by the drop method was contra-indicated but warmed ether vapor with oxygen gave good results. Some of these cases of a more serious nature were done under local anesthesia. This latter method or the employment of N_2O and O was our routine practice for chest cases at the Base Hospital.

Surgery of the thoracic cavity has made veritable leaps and bounds as a result of the experience gained during the war. Procedures heretofore deemed unwise and impossible have now become more or less common. Even the suturing of lung tissue and under some circumstances of the heart itself are now within the possibilities of modern surgery. Thus, some good has resulted from these years of human strife.

I have already referred to the Shipway apparatus for administering warmed ether vapor. We used this extensively in the British service. Besides being much pleasanter for the patient than ether by the drop method, it had the advantages of a quicker induction period with less struggling, much less mucous secretion and far less nausea. It also conserved at least 50 or 60 per cent. of ether, an item of no mean consideration when supplies were difficult to obtain.

It is a simple adaptation of the principle of the more complicated insufflation type of apparatus with which we are familiar here at home. It consists of an ordinary thermos bottle containing a U-shaped coil of metal tubing. Through this the vapor of ether or chloroform, or a combination of the two as desired, is forced from bottles of each attached to the apparatus and conducted by ordinary rubber tubing, to the inside of an Esmarch mask covered with gauze and a towel to confine the vapor. A valve or switch controls the mixture. Ordinarily a hand-bulb similar to the one used on a cautery is employed to drive the vapor through the bottles to the patient. I have used a foot-bellows for the purpose. We often attached a cylinder of oxygen when we desired to give ether-oxygen. By this method much less ether is dispersed into the atmosphere of the operating theatre than by the drop method, a fact much appreciated by those working for twelve or fourteen hours in such an atmosphere.

Usually there was no previous preparation of the patient prior to operation. Atropin was not necessary with the warmed ether method and in practically every case morphin had been given hypodermically at the dressing station a comparatively short time before the patient arrived at the the C. C. S. If so, this fact was always recorded, with the dose, on the patient's Field Medical Card. This, by the way, was a very ingenious though simple and exact, record of a patient's wounds and their subsequent treatment. It always accompanied him wherever he went, from the dressing station, through the various hospitals in France, crossing with him to the hospital in England which was his final destination. He could no more escape it than he could his shadow, and woe be to any attendant who permitted this card to be lost. It constituted a cumulative record of the patient's entire medical and surgical treatment.

As a rule, morphin was withheld from those suffering from severe shock as it apparently lowered their resistance in a marked degree. Marshall's opinion is that cases suffering from severe shock due to injury or hemorrhage have small chance of rallying if, before operation, they receive more than ¼ gr. of morphin. If exhibited at all it should be in small doses.

Chloroform as an anesthetic is contra-indicated in cases of shock. Under ether, they apparently improve during operation but often later there is a marked reaction and frequently a complete collapse. Nitrous oxid and oxygen is the anesthetic, par excellence, here. How often I regretted the fact that we did not have a proper supply at the casualty clearing station. Ether-oxygen was the best substitute at hand.

A light anesthesia is all that is required in such cases and with nitrous oxid and oxygen, if care is observed, there is no further fall in blood pressure and the patient rallies remarkably at times even after an amputation involving the upper third of the thigh.

An observation that was made by different anesthetists was that, if a patient had been anesthetized for a long period, say an hour or more, and then was turned over in order to facilitate the excision of other wounds than those given first attention, collapse was apt to occur. Because of this, care was usually observed in placing the patient on the table so as to avoid turning. The first half-hour appeared to make little difference. Accordingly, in a case of multiple wounds involving the turning of a patient, the minor ones received first attention, if this was allowable, and then the patient was placed in the final position for the operation requiring the most time.

THE PSYCHIC ELEMENT DURING INDUCTION.

Another interesting observation which I made was of a psychic nature and has no bearing on anesthesia except in the induction period. Patients anesthetized a few hours after being wounded, especially if they received their wounds during the intense excitement of battle, are very prone to have a period of violent excitement while in the so-called second stage of anesthesia. Apparently they live over their fierce and trying experiences on the battlefield, shouting, struggling, calling to their comrades and hurling wild challenges to the foe as though in the very midst again of the confusion and turmoil of battle. The assistance of several strong orderlies was usually necessary to restrain these violent patients.

Several days later, back at the Base Hospital, this experience is not so common. The impressions made upon their subconscious minds apparently become less distinct. At Camp Sherman, in dealing with our own soldiers returned from overseas I have found an entire absence of such phenomena. In fact, it is rarely that we ever have any marked symptoms of excitement.

MARSHALL'S OBSERVATIONS ON SPINAL ANESTHESIA

I have spoken of the various anesthetic agents which I employed in my work overseas but have not mentioned spinal anesthesia or analgesia. I had no experience with this nor with ether given intravenously, or per rectum. All of these methods were employed by different anesthetists with varying success though they were not generally used.

Major Geoffrey Marshall, of the Royal Army Medical Corps, made some interesting experiments with spinal anesthesia which I shall relate briefly in closing. He says, "In choosing an anesthetic for the more seriously wounded, the one overwhelming factor is safety. We require a method which will not be harmful to the patient already suffering from shock of injury and one which will minimize the shock of operation. It has been urged that spinal anesthesia would meet these requirements." He further states that his experience at base hospitals bears out this supposition but at the C. C. S. when dealing with recently wounded men, his results had not been so happy. Especially was this true of patients who had lost considerable blood. In these exsanguinated cases he finds that spinal anesthesia is strongly contraindicated and that the subcutaneous or intravenous injection of normal saline apparently does not assist in making spinal anesthesia at this stage any safer. He had had no experience it seems with it following blood transfusion. He further states, "In deciding upon the use of spinal anesthesia, the safest guide is the relative content of haemoglobin in the blood. The appearance of the patient is of little assistance, the pulse-rate and the blood pressure do not help us at all. In practice, I find that 110 per cent. hemoglobin is an average. If I find that a recently wounded patient has a percentage of hemoglobin present of over 100 per cent. it is usually safe in my opinion to employ spinal anesthesia. On the contrary, if it is below 100 per cent. he will almost certainly show a serious fall in blood pressure and collapse."

He cites 22 cases whose blood was markedly dilute which were operated upon soon after receiving their wounds. All but three of these showed signs of serious collapse.

Of 16 short interval cases which had not suffered from severe hemorrhage and whose blood was consequently not dilute 13 showed no untoward symptoms after injection. Six other cases which were operated more than forty hours after being wounded showed no signs of collapse. Continuing, he says, "If we then divide the cases into classes according to the length of time which elapsed between the reception of the wound and operation, we find that until we deal with intervals exceeding 40 hours, cases with dilute blood suffer a large decrease in blood pressure, as a result of injection of stovain, while the fall in pressure in cases with normal blood concentration is less than half as great. When the interval exceeds forty hours the fall in pressure in both types is small and about the same."

He finds that though these different cases react differently to spinal anesthesia, there is however, little difference in the average initial pulse rate and blood pressure of the two types. As regards the appearance of the patients, some of those in the first group were obviously pale and some were not, although estimation of their hemoglobin showed their blood to be dilute. These latter ones showed as profound collapse as those in whom the loss of blood was evident clinically. Major Marshall in his experiments used stovain in 3 to 5 per cent. solution and in doses of one to two C.C. When smaller doses were used, he says anesthesia was incomplete or so slow in appearing that it was impractical for use at a C.C.S. Where he tried to combine spinal with general anesthesia the fall in blood pressure was more profound than in similar cases where either method was employed alone. In so far as I could learn he had not used novocain in spinal anesthesia. Some of the greatest falls in blood pressure, he says, were associated with the smallest doses of stovain and the reverse was also true.

In line with Major Marshall's observations are those of Lt. Com. Wm. S. Bainbridge. He states that, "in summing up the findings of many surgeons it would seem that spinal anesthesia is contra-indicated in persons already in shock or collapse and for this season it is considered by some to be unsuitable in war surgery." However, it no doubt has its place in war surgery though the cases which it is to be used should be selected cases.

CHLOROFORM FOR MINOR SURGERY.

While dealing with the employment of chloroform, I neglected to mention our use of it in minor surgical procedures in the case of those we termed the "walking wounded." A separate dressing tent was reserved for them and one end of it was kept clean and sterile for doing primary and small secondary sutures. The patient would be placed upon the table and the operative field would be prepared and when everything was in readiness, a cone in which had been placed five cc. of chloroform would be handed to the patient with proper instructions and suggestions. After a few inhalations, sufficient anesthesia would be obtained to permit excising and cleaning up the wound and inserting the sutures. This method proved very satisfactory. It pleased the patient, dispensed with the services of a set of stretcher bearers, answered the purpose of the surgeon and was a great time saver.

SOME OF THE RESULTS OF SERVICE.

There were times, too, when we were extremely busy, when every minute counted. Again there were others when we could work without such breathless haste. During the summer and autumn of 1917, and again when the great German drive was threatening us in March, April, and May, 1918, as well as during the fierce and feverish fighting of the closing weeks of the war, we worked under tremendous pressure, sixteen to eighteen hours at a stretch, for days at a time. Our record for one period of ten days was one hundred major operations a day. Were we tired and exhausted? Well, just ask us! Yet, throughout all our experiences there was the finest spirit of cooperation on the part of all and when our work was finally finished we felt a just pride in what we had accomplished.

Base Hospital No. 4 cared for over 70,000 patients, 4,500 of whom were Yanks, while our Mobile Hospital, during the short period of its existance, has a record of another thousand.

Our relations with our British and French confreres were very congenial. We had much to learn from each other, and I am sure that we, as representatives of different nations, grew to admire and understand each other in a manner we little dreamed of before our common experiences in the war. It was a period of our lives which we shall never forget. The sublime fortitude and courage of the wounded men made us ashamed to even think of our own little troubles and taught us not to complain. Our community life taught us patience, forbearance and cooperation; while our contact with other races and peoples broadened our horizons and quickened our sympathies.

We learned how true it is that one-half of the world does not know how the other half lives, and that this ignorance is largely the source of so much of the misunderstanding between nations. If the war has accomplished nothing else, it has brought the ends of the earth into closer proximity than ever before and made us in reality neighbors, and let us hope in time—brothers. While no doubt it has made each one appreciate more highly his own land and customs, we have discovered much that is good in other lands and peoples which we never suspected. We shall never be as insular as before. Is it too much to hope that as a result there will in the future be developed a still closer bond of fellowship between those who fought and worked and played together "over there," during those trying days? We have learned many things of value to us, professionally and otherwise.

For some of us the hardest lesson is still to be learned. That is, how, after two years of army routine to adapt and readjust ourselves to the demands of civilian life. Personally I find that it is not easy. Eventually it will be accomplished and we shall emerge out of our various experiences in the Great War bigger, broader, and more useful men and women. We have learned something of the joy of unselfish service, and that alone should be worth any sacrifices it has cost.

3794 W. 25TH ST.

ETHER ANALGESIA BY INHALATION FOR MINOR OPERATIONS.*

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The method herein described is a modification of the ether *rausch* used frequently, especially in the German clinics, by which an analgesia lasting from 1 to 3 minutes is produced by having a patient take several breaths from a closed cone saturated with ether.' An attempt has been made to improve upon this rausch by lengthening the induction period, thus making it safer and more pleasant for the patient, and by prolonging and controlling the period of analgesia so as to widen the field of operations to which it is applicable. The method was developed in U. S. Base Hospital 13 in France as a result of the very frequent need of producing analgesia or very light anesthesia, nitrous oxid gas being unobtainable in our hospital center. Local anesthesia was not only unsuitable but contraindicated, many wounds being severely infected.

VARIOUS METHODS OF ANALGESIA.

That there is need of analgesia in the surgery of civil life, but more especially in the surgery of wounded soldiers is apparent from the large number of mixtures of drugs and methods of administration reported in recent literature. There is Capt. James T. Gwathmey's oral method. He administers 1 fl. ounce of 50 per cent. ether in liquid petrolatum with 5 minims of peppermint water. This is given by mouth sandwiched between mouthfuls of port wine. One advantage of this method is that the presence of the anesthetist is not required. Capt. Arthur E. Guedel reports the use of a mixture of ether 24 cc, ethyl chlorid 5.5 cc, chloroform 0.5cc, and oil of orange 0.125cc. This mixture is given by inhalation by the closed method. A number of other mixtures including Somnoform have been employed. Wilkie (D. P. D.) reports success in obtaining a transient analgesia by applying 3 drachms of ether to a Schimmelbusch mask which is then wrapped and covered tightly with a towel.

Analgesia begins in from 30 to 50 seconds and lasts from 50 seconds to 3 minutes. Our surgeons called for some method safer than ether by mouth or any ethyl chlorid mixtures by inhalation and for an analgesia often lasting more than 3 minutes, hence the following was worked out and employed in over fifty cases.

PREPARATION AND PRELIMINARY MEDICATION.

Thorough preparation of the patient, both physical and psychologic, is more important to the success of the analgesia than to the safety of the patient. Mild catharsis and restriction of food and liquids should be the same as before any general anesthetic. A hypodermic injection of morphin and atropin given about 1 hour before the operation aids materially in calming the patient's mind and is helpful in producing narcosis though not at all essential. The cooperation of the patient is quite necessary. His confidence can practically always be gained by telling him that he will not have to take much ether if he will relax his mind as well as his muscles, that he will not be sick afterwards and can eat and drink as usual. He is assured that he will feel no pain, that his operation is not serious nor exceedingly painful but a little too painful to be performed without an anesthetic. He is promised that he will not feel any sense of suffocation as he is going under, and he never should, or his fear is excited.

TECHNIC AND APPARATUS.

The technic and apparatus are simple and easily adaptable to use in the wards as well as in the operating room. A Schimmelbusch mask covered with two layers of fine wool stockinette is preferable. A towel or gauze roll is in readiness for wrapping around the edges only, of the mask. The patient's eyes are covered with wet cotton. Squibb's ether is preferable, though several of our cases were given the British P. P. of ether and Merck's ether. It requires a little more of the British ether than of Squibb's. Mallinckrodt's ether was a failure in these cases.

The patient is in the operating room or in bed in his ward so that he is not moved until after the operation. If he is strong he is firmly yet comfortably tied down. Patients operated upon in bed were never tied. The field of operation is prepared and the surgical team is ready to begin work. Then the administration of ether is begun. The mask is lowered to the face by the end of 2 minutes if possible, and after a few more respirations the towel is wrapped around the mask, tightly if the patient is large and husky, but loosely if he is not. At the end of 4 to 7 minutes the patient is almost always ready for the operation. During this induction period there should be very little talking or other noise in the operating room and the surgeon and assistants should not palpate, probe or touch the patient anywhere near the field of operation. This non-interference in the first few minutes cannot be emphasized too greatly, for a patient feeling a probe will fear that he is being operated upon and he may be past the stage of reasoning. He is taken just *to* but not *into* the stage of ether excitement. He is usually in a state either of semi-consciousness or of unconsciousness, though occasionally he may be conscious. It is very difficult to maintain this state and to increase the administration at exactly the proper rate when painful procedures are begun, since the margin between perception of pain and the excitement period is exceedingly narrow. It is, I believe, a considerably narrower margin than that between consciousness and the asphyxial stage with nitrous oxid-oxygen.

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*Read during the Seventh Annual Meeting of the American Association of Anesthetists, at The Breakers, Atlantic City, N. J., June 9-10, 1919.

After the anesthetic is once begun very little is said to the patient except an occasional word of instruction to breathe regularly and naturally, or a little faster or more deeply as is needed in the individual case, and an occasional assurance that everything is all right and that he is doing splendidly. When he is ready for operation a quiet signal is given to the surgeon to begin. In some subjects it is difficult to maintain the desired stage of analgesia or light anesthesia longer than from 3 to 5 minutes, while often it can be maintained quite satisfactorily for 10 to 20 minutes.

RESULTS.

The administration of ether can seldom be discontinued more than a few seconds before the termination of the operation. Within 1 minute after the mask is removed the patient will obey a command to open his eyes. Before the dressing is bandaged on he begins to grin and talk. His face is washed with cold water and he is told to take several deep inspirations through a cold wet towel. If this is done as soon as he is awake enough to respond, nausea will very seldom occur. Upon awakening the patient is very happy, often hilarious, but in 2 or 3 minutes he talks rationally. A few patients moved, talked or yelled during the operation, but showed no signs of shock afterwards, their color and pulse being those usually resulting from the stimulation which a small amount of ether produces.

Theoretically such a stage of extremely light operative anesthesia seemed impossible, but practically it was found to be possible in about 95 per cent. of the cases attempted. Two corps men, (medical students), who attained considerable skill in anesthesia, learned to give these light anesthesias quite successfully.

INDICATIONS AND CONTRAINDICATIONS.

The guiding factors in choice of subjects were, brevity of operation and the number of recently preceding and of probable future ether anesthetics to which the patient had been or would likely be subjected. Soldiers who have lived out of doors and drilled are muscular and require considerably more ether both to induce and to maintain general anesthesia than do people leading an indoor life who constitute the vast majority of patients in our city hospitals. But, on the other hand, most soldiers are good subjects for this primary anesthesia because of their ready cooperation and self-control. The only contra-indication observed is in the case of a partially united fracture which might be broken over if the patient should resist at a time when it was necessary to raise the extremity in order to properly insert through and through drains. If the patient should have sufficient perception of pain at any time to cause him to hold his breath, a few drops of ether should be poured upon his chest before time has elapsed for more than one or two respirations. The cold on the chest never fails to stimulate respiration if it is employed quickly enough. It can be repeated until sufficient ether has been inhaled to overcome the difficulty.

SUMMARY.

Since statistics and tables are prosy, only a collective summary of facts deduced from a carefully worked out table will be presented here.

1. A hypodermic injection of morphin sulphate gr. ¼ and atropin gr. 1/150 was given ½ hour to 2 hours preceding operation in about 14 per cent. of the cases reported.

2. Period of induction, 50 per cent. of cases required 4 to 7 minutes, 25 per cent. less than 4 minutes and 25 per cent. more than 7 minutes.

3. The usual amount of ether required was 1 to 1½ ounces. Fifty per cent. of the cases had 1 ounce or less, 10 per cent. having been given only ½ ounce; 20 per cent. were given 2 or 2½ ounces.

4. The chief merit of this method lies in the small amount of ether required. This is of paramount value in septic patients or those who have lost considerable blood or who are weak from prolonged and painful illness in bed. Most of these patients require only ½ to 1 ounce of ether over a period of 15 minutes or more. This amount cannot possibly endanger the kidneys or reduce to any dangerous extent the resisting powers of the blood.

5. The actual duration of the operation varied. It was less than 5 minutes in nearly 40 per cent. of the cases; 5 to 20 minutes in over 60 per cent. of the cases and was 10 minutes or longer in 25 per cent. of the cases.

6. The operations performed under this light anesthesia were quite varied. Many were the opening and drainage of abscesses, infected knee, elbow and smaller joints, opening of a deep abscess of

buttock from which a pint of pus drained; opening of abscesses in abdominal wall following injection of anti-tetanic serum; drainage of sinuses from compound comminuted fractures of various bones including the femur, and drainage of a subpectoral abscess following an infection of the index finger. In one case the soft parts of the stump of a thigh infected with gas-bacillus were radically removed. Parts of the matrix of infected nails were removed. A through and through bullet wound of the scapula and clavicle was opened and drained. Foreign bodies were removed even when imbedded in bone. An artery, hemorrhaging a few days after a hemorrhoidectomy, was satisfactorily tied. And even an exploratory laparotomy was performed with 1½ ounces of ether and no hypodermic adjuvant, the operation lasting 19 minutes.

CONCLUSIONS.

1. Painful dressings and short operations, even though quite painful, can be satisfactorily performed by having the patient inhale, without a sense of suffocation, less than 2 ounces of ether (2½ ounces as a maximum) during an operation continuing from 5 to 20 minutes.

2. This anesthesia is not preferable to nitrous oxid-oxygen, but is a most excellent substitute when gas is not obtainable or too costly.

3. The method is most practical, simple and adaptable.

4. The method is exact. The anesthetist determines at each moment what is the least amount of ether required. The patient is always awake 2 or 3 minutes after the operation. Such precision of dosage is possible only with the inhalation method. The presence of the anesthetist is necessary not only to regulate dosage and to guard the safety of the patient, but also in case the surgeon finds it necessary to perform a more radical operation requiring a deeper anesthesia.

5. Efficiency and *safety* are the most important considerations in any anesthesia. This anesthesia is as efficient as that produced by nitrous oxid-oxygen alone. It proved to be safe, there having been no untoward effects either immediate or remote even in cases just recovering from double pneumonia and severe attacks of influenza.

6. Hence this method of analgesia primarily resorted to in war emergency work, is recommended for surgery in civil life.

I am indebted to Major Vernon C. David, who was in charge of surgery in Base Hospital 13 during its active service, not only for the inspiration to perform these experiments, but for his most kind cooperation throughout the work.

1618 W. ADAMS ST.

HEART LESIONS IN ANESTHESIA*

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The conditions under which the anesthetist examines a patient are frequently far from ideal. The examination is often made with time limited and at short notice. Under such circumstances the exact diagnosis of the cardiac condition is not of first importance, but one must find out whether the heart lesion is compensated and determine how much of a strain can be put on the diseased organ.

THE BREATH-HOLDING TEST.

A general preliminary test that I have found of great use is the breath-holding test. This test is familiar to you all but I will repeat it. The patient is requested to take three long breaths, holding the last one as long as possible. If he cannot hold his breath for 40 seconds he is subject to investigation to show cause for this failure. The failure may be due to (a) respiratory embarrassment from disease of the lungs or pleura; (b) respiratory embarrassment from intra-abdominal pressure (tumor or ascites), (c) disease of the heart; (d) toxemia, (e) anemia, fatigue or excitement. *Lessened time* as you see does not necessarily indicate disease of the heart nor does full time always indicate a normal heart, but lessened time always shows cause for further investigation.

COMPARATIVE DANGERS OF VARIOUS HEART LESIONS.

Valvular heart leions that are perfectly compensated and with a reasonable margin of safety offer very little danger from the anesthesia. When, however, compensation is broken or the margin of safety is very narrow the danger of the anesthesia increases markedly. Lesions of the aortic valve are more serious than lesions of the mitral valve, and stenosis is more serious than simple regurgitation. Endocarditis and degeneration of the myocardium offer much more serious risks than chronic valvular disease, and I have a great fear of angina pectoris, and other conditions where the heart muscle is weakened. In general if the heart lesion does not interfere with the ordinary affairs of life it will not interfere with the taking of an anesthetic. One can get a fairly accurate idea of what the heart will stand under the anesthetic by the history of the behavior of that heart under the strain of ordinary life.

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MAINTAINING BLOOD PRESSURE.

In the case of patients with serious disease of the heart of whatever nature it may be, there is one fundamental principle about which all our treatment should center—maintaining the blood-pressure at a point as near as possible to the level which is normal for that individual. One should keep this in mind in the pre-operative treatment, the operative procedure, the selection and administration of the anesthetic, and in the post-operative care.

PREOPERATIVE MANAGEMENT.

Wherever possible, patients with cardiac lesions should be put in bed, if they are not already in bed, and watched for a number of days without any change in their medication or food. The patient should be in about the position that he will have to occupy after the operation. This gives one an idea of how the patient should behave under conditions that would be ideal during convalescence—in other words, it gives us a *baseline.* Blood-pressure should be taken at least once a day and I wish particularly to emphasize the importance of the diastolic pressure. In this period one has an opportunity of observing the effect of the post-operative position on the condition of the heart and lungs.

The character of the diet before operation should be changed as little as possible from the normal. If the operation is to be at all protracted it is advisable to reduce the fats and increase the carbohydrates. I feel that the giving of 10 to 20 grains of sodium bicarbonate two hours before the operation is of some advantage. Cathartics should never be given unless the patient is in the habit of taking them.

When the time comes for the operation the patient should be *carried* to the anesthetizing room and never be allowed to walk or to exert himself in the least. Many of these heart cases are high-strung and nervous, and fright is certainly a factor that should be reduced to a minimum, even though it is not possible to eliminate it.

Morphin and atropin should usually be given as preliminary medication and it is necessary that they be given sufficiently early to allow of their maximum action before the anesthetic is started.

MANAGEMENT DURING OPERATION.

The patient should be placed on the operating table in a comfortable position. If the patient has been in the habit of sleeping with three or four pillows there is a reason for it. The patient has discovered the position in which he sleeps most comfortably and no preconceived ideas of ours should interfere with his comfort. There is a more potent reason for this than the simple giving way to the patient's whim. If one wishes to have a smooth induction it is necessary to have the patient physically as well as mentally comfortable. *If this usual sleeping position of the patient is not compatible with the operative procedure the position should be changed very gradually after the patient is fully anesthetized, for any sudden change may cause a serious interference with breathing or heart action.* It is particularly necessary to change the position gradually when the Trendelenburg posture is required, and the surgeon should be willing to dispense with this position in case of serious interference with the cardiac or pulmonary function, even if very inconvenient for him.

SELECTION OF THE ANESTHETIC.

With regard to the selection of the anesthetic. If the operation can be performed *without pain* under local anesthesia and the patient is not too apprehensive, this offers by far the least risk. It must be remembered that many operations that can be performed under local anesthesia without pain are not without certain sensations, namely, the feeling of pressure and traction, which may be interpreted as pain by a nervous and apprehensive patient. The fear in these instances may be a greater element of danger than the taking of a general anesthetic would be. Fear and pain will drive up the blood-pressure just as surely as ether or nitrous oxid, and the exhaustion following a long operation under local anesthesia is a factor that must be given proper consideration.

Spinal anesthesia should never be given to patients in whom the compensation is broken or in whom the margin of safety is narrow. It is a good rule not to use this form of anesthesia in any patient who will not stand a temporary fall in blood-pressure of 50 per cent. Patients with arteriosclerosis stand spinal anesthesia quite well and they usually have the sluggish nervous system well suited to operations on a conscious patient. Here again one should consider the nature of the operation, for it is generally conceded that spinal anesthesia is not safe for operations above the umbilicus.

Paravertebral anesthesia would offer many advantages over local or spinal anesthesia if it were not for the preliminary dose of scopolamin, a drug that is too much of a depressant and too uncertain in its action to be used in cases with serious heart lesions.

Gas-oxygen, which has been heralded by its enthusiastic supporters as the safest of all general anesthetics, is in reality far from safe in many cases, especially in cases of broken compensation or angina pectoris. I believe that the danger is probably due to the rise in blood-pressure that is always present to a certain degree and may become quite extreme if rebreathing is excessive or where slight cyanosis is present. Operations requiring little or no muscular relaxation and of short duration may in many cases be done with less disturbance to the patient under gas-oxygen than under any other form of anesthesia, but where the operation is of long duration, and especially if muscular relaxation is required, this form of anesthesia offers certain grave dangers.

One of the advantages claimed by the enthusiastic supporters of gas-oxygen is the rapidity with which the patients regain consciousness after the operation is completed. This is certainly dramatic; but is it a real advantage? If the operation is one that will be followed by much pain the patient regains full consciousness at a time when this pain is at its height, and this may in part counterbalance the advantages of this form of anesthesia. The pain is much less if the anesthesia technic of Crile is followed out, but there is the loss of some time in doing the local anesthesia.

Another advantage claimed for gas-oxygen is the lack of nausea and vomiting—matters of considerable importance, especially in heart cases. I believe that almost as many patients vomit after prolonged gas-oxygen anesthesia as after open or vapor ether, but both the duration and severity of the vomiting are less. This is a real advantage.

Ether, like gas-oxygen, drives up the blood-pressure; but to a less extent, if properly given. Ether is a cardiac stimulant of more even action. Its use is usually followed by a period of deeper and longer depression than gas-oxygen, and it is this period of depression, following the administration of ether, that one should fear rather than the actual operative period. There are hardly any patients with heart lesions who will not go through the operative period of reasonable length with an ether anesthesia, but some of these patients will not survive this period of depression following. To a certain extent the length and severity of this period of depression are governed by the depth of the anesthesia and the length of the operation.

Chloroform, unlike gas-oxygen and ether, lowers the blood-pressure. Chloroform has certain advantages over ether. It is not unpleasant to take and it is somewhat quicker in its action. There are three periods of danger in its use. (1) Probably the highest percentage of fatalities in patients with heart lesions occurs during the induction, where with little or no warning the heart action stops. When this occurs it is not often possible to resuscitate. (2) The second period is during the maintenance, and the danger here is much less than in either the first or the third periods. (3) The third period is from three to five days after the operation and is due to the toxic action of the chloroform on certain organs, notably the liver, adrenals and heart muscles. Unfortunately, this action has not been recognized until quite recently, deaths occurring during this period being attributed to other factors than the anesthetic. I do not feel that we are yet in a position to estimate the seriousness of this danger period, though I believe that it is of real importance.

ANESTHETIC MIXTURES.

Theoretically, it would seem as if we should be able to combine ether with chloroform in such a way that there would be little or no change in the blood-pressure. This has been tried for many years, notably by the English in the various A. C. E. mixtures. A mixture of ethyl chlorid, chloroform and ether has been commercially exploited and largely used in America, but I believe it is now falling into disuse, as are the A. C. E. mixtures of the English. The addition of a little chloroform to the mask is very useful when one induces anesthesia with ether, but the mixture should be made on the mask *as indicated* and not according to any preconceived formula. A very little chloroform dropped on the mask with the ether shortens the period of induction and reduces the amount of excitement. It also diminishes the rise in blood-pressure that is seen with a straight ether induction. It is rarely desirable to continue its use after the period of deep anesthesia has been reached.

MANAGEMENT DURING THE POSTOPERATIVE PERIOD.

During the postoperative period it is more important in these heart cases than in the ordinary cases to prevent any unnecessary overload and to maintain the nourishment of the patient at a high level. Overload may come from various causes; among them the kidneys and intestines play a large part and it is necessary to keep them functioning properly. Water must be given early and freely. When for any reason it cannot be given by mouth it must be given either by rectum or subpectorally, and in rare instances intravenously. It is advisable to begin food by mouth very early, and when I speak of food I do not mean beef tea and chicken broth; I mean food of real caloric value. When a patient cannot take food by mouth within 18 hours it is advisable to give nourishment by rectum. Glucose may be given by rectum in 5 to 15 per cent. strength and liquid peptanoid may be added to this if desired or wherever rectal feeding has to be given over a protracted period.

VALUE OF DIGITALIS.

In spite of the modern skepticism about the use of digitalis in patients with arteriosclerosis, I feel sure that it is of considerable value in tiding over the period of depression that often follows operations on old people. Of the other so-called heart stimulants, most are absolutely useless. The judicious use of morphin must not be forgotten. *More heart cases require rest after the operative period than require stimulation.* I wish to emphasize the importance of attention to the careful and detailed treatment of heart cases during the preoperative and postoperative periods as well as during the operation and anesthesia.

543 BOYLSTON ST.

DISCUSSION.

DR. W. G. HEPBOURN, Montreal, Canada: It is a very good plan in handling patients with known heart lesions, coming to operation under general anesthesia, to digitalize in advance. In this way when the postoperative crisis arrives some three or four days after operation, the hearts of these patients are in condition to meet the extra strain placed upon them. In some cases there is time enough to begin giving the digitalis if patients show symptoms of decline after operation, but the former method is the safer.

DR. JOS. E. LUMBARD, New York City, N. Y.: Stange's breath-holding test, while a most valuable one for determining the fitness of patients for operations under anesthesia, does not always indicate heart lesions. Limited breath holding ability may be associated with many other conditions than those immediately affecting the circulation It goes without saying that such conditions must be differentiated if the test is to be rendered of any value. Also patients must be taught how to accept and perform the test properly. Personally I regard patients as bad, fair or good risks as they are able to hold their breath for from 20 to 30 to 40 seconds. While bad risks should be given the benefit of operations under local anesthesia, at the same time if the element of fear enters into consideration, then the bad risk should be operated on under general anesthesia, as the psychic strain on the heart of the conscious patient may exceed the effect of an anesthetic carefully given.

DR. S. GRIFFITH DAVIS, Baltimore, Md.: Occasionally emergency cases present in which it is difficult to differentiate acute cardiac conditions from other profound and endangering pathology. I recall a patient, hurried into the hospital, after a collapse on the street, showing every evidence of acute cardiac dilatation due to passive congestion of the liver, but giving a history of gastric ulcer from the report of the family doctor. Pain and rigidity of the abdomen pointed to a probable rupture of the gastric ulcer. On consultation it was decided that operation was imperative. Morphin ¼ gr. was given and ether administered by the open method, very carefully. All went well until relaxation supervened, when the heart ceased beating and after some five respiratory efforts death occurred. The abdomen was opened at once and it was found that passive congestion of the liver and not ruptured gastric ulcer was responsible for the symptoms that had presented.

DR. F. L. RICHARDSON (closing): I prefer the use of the newer digitalis preparations to that of the older tincture, which is slower in action. With them it is quite possible to establish a cardiac reserve if digitalinization is begun after the patient's reaction to operation is indicated. I agree with Dr. Lumbard that the breath holding test must be properly made and its results cautiously interpreted. It should never be made with the patient in a condition of apprehension.

THE INFLUENCE OF AGE IN SURGICAL PROGNISIS.*

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It is a matter of common belief that old people are not favorable subjects for surgical operations. The degree of danger attending operations on the aged is undetermined and the limits of the danger period are unknown. These points may be learned by consideration of the mortality rate at different ages in a series of operations.

RECORDS.

For this purpose a series of 1,000 consecutive cases has been chosen. The record of each case covers; the preliminary examination, the period of the operation, and the recovery.

The preliminary examination includes the age and appearance of the patient, the condition of the heart and lungs, an examination of the urine, and a test of the blood pressure. As the examination is made from the anesthetic standpoint, the surgical condition is noted in a general way but is not particularly studied.

CLASSIFICATION OF CASES.

Following the examination each case is placed in one of three classes which is then noted upon the record chart. Class 1 includes the good operative risks, patients free from serious organic defects and whose surgical condition is not likely to prove fatal. Class 2 includes the fair risks, patients handicapped by organic lesions but whose surgical condition is not specially serious.

Class 3 includes the poor risks, patients whose surgical condition is so serious as to render the outcome doubtful.

All patients of the first class are expected to recover. Operations on patients of the second class are approached with less assurance and major operations are performed only when urgently required. In the cases of the third class, the operations are urgently necessary and a high degree of mortality is expected. In making this classification, the blood pressure is a factor of prime importance but is disregarded in this study as it has been elsewhere considered.

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*Read during the Seventh Annual Meeting of the American Association of Anesthetists, at The Breakers, Atlantic City, N. J., June 9-10, 1919.

Record During and After the Operation.

During the period of the operation the condition of the patient and data of interest in the anesthesia and the operation are noted frequently on the record sheet. This chart is ruled to correspond with time by the clock. The beginning of anesthesia, commencement of the operation, important details of the anesthesia or the operation and the completion of the operation are noted at the moment when they occur. The pulse rate, respiration rate, condition of the pupil, color, and systolic, diastolic, and pulse pressure are noted at five to ten minute intervals. The dosage of the anesthetic is noted continuously.

The postoperative record includes the character of the recovery, the presence or absence of nausea and vomiting, the presence or absence of complications, and the final recovery or death of the patient.

For such records a loose leaf system is most convenient and efficient. The recent record sheets and a supply of blanks are carried in one binder in the anesthetist's bag. The record sheets are kept in this binder for two weeks following the operation. If recovery is uncomplicated at the end of this time, the record is transferred to a permanent post binder. If any complication appears the record is held in the temporary binder until the outcome can be learned.

The record sheets are dated and numbered consecutively and are collected in series of 1,000 consecutive numbers. Accounts are kept on ledger cards which are filed under the patient's name alphabetically. On each ledger card is noted the operation number thus providing an alphabetical cross index by name of all the cases.

Several summary sheets are filed with each series of 1,000 records. One sheet headed deaths, contains the case numbers of the fatalities with the cause of death in each case. There is a similar sheet provided for complications. There is a sheet for gas-oxygen cases, one for ether cases, and one for cases of especial interest.

Such a record system requires little time and is invaluable in the study of such a subject as surgical shock or the one in which we are now interested.

Tabulation of the Cases.

To find what relation exists between age and postoperative mortality, it is necessary to tabulate a series of operative cases with regard to these two factors. In the following tabulation of 1,000 consecutive operations; Class A includes patients under 50; Class B, those between 50 and 60, and Class D, all over 70 years of age. Class 1, the good risks, Class 2, those patients who are handicapped by demontrable organic lesions and Class 3, desperate cases in which recovery with or without operation is problematical.

Tabulation of 1000 Cases.

Class A	Under 50 years.
Class B	50 to 60 years.
Class C	60 to 70 years.
Class D	Over 70 years.
Class 1	Good Risks.
Class 2	Handicapped patients.
Class 3	Desperate cases.

Total Cases.

		Class A	Class B	Class C	Class D
Total	1000	729	137	79	55
Class 1	734	603	78	34	19
Class 2	179	94	38	26	21
Class 3	87	32	21	19	15

Deaths.

		Class A	Class B	Class C	Class D
Total	45	12	14	12	7
Class 1	2	0	1	1	0
Class 2	14	1	5	3	5
Class 3	29	11	8	8	2

Mortality Per Cent.

		Class A	Class B	Class C	Class D
Total	4.5	1.5	10.21	15.19	12.72
Class 1	.27	.0	1.28	2.94	.0
Class 2	7.82	1.06	13.15	11.53	23.81
Class 3	33.33	34.37	38.09	42.10	13.33

Results.

The mortality rate in the 271 cases over 50 years of age is eight times as great as in the 729 cases of less than 50 years. The mortality rate increases slowly from 50 onwards.

Of the two fatalities among the 734 cases of Class 1, one resulted from peritonitis which developed after the operation. The second was due to coronary embolism. Although no organic defect was discovered at the preliminary examination, this case was inoperable under Moots' rule. Probably too little consideration has been given to this rule in making the preoperative classification of cases. In the cases of this class, the mortality rate is practically without variation corresponding to age.

In the cases of Class 3, age has but little influence on the outcome.

Among the 179 cases of Class 2, the patients handicapped by demonstrable organic disease but with surgical conditions not specially serious, the mortality rate in the 85 cases over 50 is 14 times as great as in the 94 cases of less than 50 years.

NOTES.

The original series of records which form the basis of this study were not made with this particular work in mind. Such records make available a scientific answer rather than an unsupported opinion for many problems concerning surgical anesthesia.

The run of cases where a professional anesthetist is employed are more serious than the average.

The fatalities in this series of cases occurred from twenty-four hours to three weeks after the operation. No death took place during or immediately following the operation.

SUMMARY.

In a series of 1,000 consecutive cases from the notebook of an anesthetist, the mortality rate in the patients over 50 was eight times as great as in the patients of less than 50 years. In the cases free from organic disease and in the desperate surgical conditions, there was little variation in the rate of mortality to correspond to the age. In the cases where complicating organic disease was discovered at the preliminary examination, the mortality rate in patients over 50 was fourteen times as great as in the patients less than 50 years of age.

131 WATERMAN ST.

ETHER ADMINISTRATION IN THE UPRIGHT POSTURE.*

FRANK DYER SANGER, M. D.
BALTIMORE, MD.

For many years I have been operating upon my patients under ether in the sitting posture. This is so commonly done in Boston and other Northern cities that usage has established the method; in some other sections of the country, particularly in the South, there seems to be a good deal of skepticism regarding its safety. I therefore endeavored, in a paper entitled "Some Advantages of the Sitting Posture in Nose and Throat Operations Under Ether," which I read before the Eye, Ear, Nose and Throat Section of the Southern Medical Association at Memphis, November 12, 1917, to show that many examples in clinical medicine suggest that the sitting posture possesses certain distinct advantages.

When I was requested to present this subject at the seventh annual meeting of the American Association of Anesthetists, I was somewhat dismayed at the prospect; I am, however, deeply appreciative of the honor you have conferred upon me, and deem it a great privilege to have my paper discussed by the distinguished members of this Association.

I would not presume to present before this body of experts any technical question connected with the administration of ether; what I shall venture to do is to call your attention to certain well established clinical observations regarding the behavior of individuals suffering from respiratory embarrassment, and inquire whether, since unconsciousness is not causatively related to the respiration but is an associated phenomenon, these observations do not justify a posture which might be termed the posture of selection from a respiratory standpoint in all operations which would not be hampered by it; whether these clinical observations could not be made helpful in the management of the respiratory difficulties which may arise in the course of anesthesia, and particularly; whether, in dealing with the more serious respiratory complications, with apnea, for instance; it would not be wiser to be guided by what the individual would probably do were he awake. In substituting our consciousness for the consciousness of our patient, should we not do for him what he would do for himself were he conscious?

RESPIRATORY PHENOMENA UNDER ETHER NARCOSIS.

During the course of ether narcosis, the respiratory phenomena are those which give us the most concern; one sees not infrequently some manifestations of suffocation, cyanosis, dyspnea, occasionally apnea. The clinician sees the same phenomena, and is impressed by the fact that under practically all circumstances the individual, when respiration is embarrassed, irrespective of the cause of the embarrassment, instinctively and sometimes unconsciously, assumes such a position as will insure the greatest freedom of respiratory movement. I trust that I may be permitted to quote at length from the paper above referred to.

REACTION OF THE CONSCIOUS PATIENT TO RESPIRATORY EMBARRASSMENT.

"Unless pain is a dominant consideration, the patient suffering dyspnea from compression of the lung, due to processes involving the pleura, always assumes a position which will insure the freest possible movement of the unembarrassed lung. Instinctively the individual with consolidation in one lung lies upon the side affected, to afford greater freedom of movement to the unaffected side. A disassociation of movement is thus accomplished in pathological conditions which would be physiologically impossible.

"When dyspnea results from bilateral conditions in the lung, from disturbances in the respiratory tract down to the division of the trachea, from conditions affecting the musculature of respiration, or the innervation of these muscles, the patient seeks an upright position. The person whose breathing is temporarily obstructed as a result of a simple coryza, finds it more comfortable to sleep high; the individual at table who chokes, instinctively gets up; the child suffering from laryngeal obstruction insists upon being held, and with broncho-pneumonia finds relief in an upright position upon the mother's shoulder. Spasm of the respiratory muscles, like spasm of the larynx, brings the individual almost instantly into an upright position.

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*Read during the Seventh Annual Meeting of the American Association of Anesthetists, at The Breakers, Atlantic City, N. J., June 9-10, 1919.

"Even more striking is the position assumed by patients suffering from circulatory disturbances in the lungs. One recognizes one's cases of broken compensation at a glance as one passes through the general ward by the upright position assumed by the patients in bed. Their ability to sleep at a lower angle from night to night bespeaks the restoration of the circulation in the lungs, as certainly as does the fading of the cyanosis. Few pictures are more impressed in their uniformity in all clinical medicine.

"One might go on citing instances to substantiate the general proposition that dyspnea, which is the first phase of aspyxia, and which may eventuate in apnea if carried to its logical conclusion, determines decubitus when caused by unilateral conditions, and, when due to bilateral causes, brings the individual into a vertical position to insure greater freedom of all the usual respiratory mechanism and to call into activity all the so-called accessory muscles of respiration, which seem to be used to greater advantage in the upright position.

"Participating in this emergency work are the following muscles—the scaleni, trapezius, lavator-anguli-scapulae, sterno-cleido-mastoid, the sterno-thyroid, sterno-hyoid, serrati and pectorals. The last five probably aid inspiration by temporarily reversing their fixed point.

"Another possible reason for assuming the upright position is to relieve the diaphragm of the embarrassment of pressure, particularly when the abdomen contains fluid. It is also possible that gravity influences materially the venous congestion of the brain and relieves the respiratory center. In the absence of a state of almost complete annulment of the circulation in the arteries, it does not seem to me that gravity could greatly influence arterial flow.

"While these phenomena may be subject to slight variations in individual cases, I think it is true that a conscious person suffering any degree of asphyxia from any cause never voluntarily assumes a position which would hamper his respiratory movements, and he, particularly, would not dream of lowering his head below the horizontal. The asthmatic gentleman finds great satisfaction in so small a matter as an unbuttoned waistcoat. The orthopneic sufferer, in his extremity fighting for air, although suffering the most extreme exhaustion, sits upright in a straight arm chair, firmly grasping the arms in his efforts to maintain a fixity of position, that will insure the greatest possible action of every available muscle of respiration."

THE ANESTHETIST'S TRADITIONAL MANAGEMENT OF RESPIRATORY EMBARRASSMENT.

These few examples are sufficient to show that conscious individuals react to respiratory embarrassment along definite lines; when, however, the individual is unconscious, and respiratory embarrassment supervenes, as may occur in the course of anesthesia, the anesthetist substituting his consciousness for that of the patient, is apt to move along traditional lines which have come to be accepted operating room procedure; the jaw is carried forward, the tongue is grasped with forceps and dragged out of the mouth, the head is lowered from the end of the table, sometimes the lower portion of the body is raised. The next usual step is some form of artificial respiration.

"Carrying the jaw forward is undoubtedly a good practice if at the same time the mouth is opened; but pushing the jaw forward, at the same time jamming the mouth shut, increases the difficulty or renders breathing impossible in persons who are not free nose breathers, or in those cases—which are frequent—in which the venous congestion has so overfilled the turbinal bodies that the nose is occluded in consequence. Dragging the tongue out of the mouth is also beneficial in its results, but does violence to that organ, causing in some instances great after-discomfort, and subjects the patient to the danger of infection through laceration.

It is gravity that causes the tongue to go back and obstruct breathing. The same gravity will cause it to go forward and open the glottis if the patient is put in a suitable position. It is doubtful whether dragging the tongue forward has any other influence upon spasm of the glottis than to increase it, although intermittent traction of the tongue is probably a stimulant to inspiration. Dropping the head from the end of the table and raising the lower half or two-thirds of the body, using in either case the shoulders for a fulcrum, places all the posterior accessory muscles of respiration at the greatest possible disadvantage, since they are bearing the weight of the body. The extreme extension of the head stretches the anterior group to such an extent that their action is also impaired. The inversion of the patient brings the weight of the abdominal contents upon the diaphragm, rendering its contraction more difficult, and finally gravitation dams back into the brain upon the respiratory center the blood surcharged with carbon dioxid. (Ask the next cyanotic individual you meet to stand upon his head and see if any consideration you can name will induce him to do it.) Fortunately these errors are usually committed serially, were they all accomplished at the same moment of apnea the recuperative powers of the patient would less frequently prove equal to the situation."

ARTIFICIAL RESPIRATION.

The necessity for artificial respiration will less frequently arise if everything is done to enable the patient to utilize his own powers. When we substitute artificial respiration for the natural function which we have helped to abrogate by hampering the respiratory mechanisms, the responsibility for the failure must rest upon us.

If artificial respiration becomes necessary it is of most vital importance that the entire respiratory mechanism be cleared for action, so to speak; our effort in performing artificial respiration is but the expression of the hope that the muscles will resume their action. We diminish that hope and frustrate our effort by placing the slightest obstacle in the way of natural respiratory movement, which clinical experience has abundantly shown to be best in the upright position.

One does not, in attempting to start a delicately adjusted mechanism, first throw that mechanism out of adjustment or place some obstruction in gears or bearings; similarly, in trying to re-start the respiratory mechanism, every muscle should be so unhampered that it will be able to respond to the faintest stimulus that may reach it. Recumbency does not meet these requirements. Its continued employment seems to me to be largely a matter of tradition.

It is probable that the recumbent position has been associated with the unconscious state from the earliest time. Sleeping recumbently no doubt gave rise to this association. It antidates all physiology. The fainting person must be placed in the horizontal position else he will fall.

THE THEORY OF ANEMIA OF THE BRAIN.

I am unable to say when the theory of anemia of the brain was first propounded, but it probably long antedates experimental physiology. It had become axiomatic in the profession when the use of anesthetics began. What could be more natural than that it should have become a guiding principle in anesthesia; that operating room tradition should be based upon it? Yet, what do we mean when we say anemia of the brain? Is there any clinical evidence to show that the difference between the amount of arterial blood in the respiratory center in the recumbent position and the upright position is sufficient to influence respiration? What is the laboratory evidence upon this question? Is the question not a qualitative rather than a quantitative one? A question of the blood content? The carbon dioxid content?

One is constantly confronted by the anemia of the brain theory when one discusses the untoward occurrences under ether anesthesia. So far as I have been able to discover there is no other reason for recumbency. No one seems to be willing to question their faith in the anemia of the brain theory, hoping no doubt, that they will not have an anesthetic casualty, and expecting their faith to sustain them in case the casualty occurs. On the other hand, the advantages of the upright posture in all cases of respiratory embarrassment are matters of such common experience that it seems strange that we have not availed ourselves of these advantages in other emergencies.

THE COMMON OBJECT OF ARTIFICIAL RESPIRATION.

The various methods of artificial respiration have for their common object the rhythmic expansion and contraction of the chest, resembling as nearly as possible the natural movements of respiration. The movement of the ribs is accomplished by the external application of force in the absence of muscular contraction. The method at present most in vogue is to place the body in the prone position in order to permit the tongue to fall forward, opening the glottis; at the same time to relieve the diaphragm of pressure. In this posture, however, the trunk is weighing upon, and hampering the movement of some of the most important respiratory muscles, it is a weight that must be lifted by each expansion of the chest. The force is then applied to the posterolateral aspects of the thorax; in other words, nearer to the articulated than to the free ends of the ribs; in the upright position with the head flexed the tongue gravitates forward and the glottis is open. Freedom from pressure upon the diaphragm is much more assured in the upright than in the prone position, the trunk not being added to the muscle load. In this position an operator and his assistant, without a great amount of exertion, can perform artificial respiration as long as there is reasonable hope of restoring the patient, being able to relieve each other without changing their positions, therefore without interfering with the rhythm of the respiratory movements; for while the assistant holds the head from behind (assuming that the patient is seated in a chair) maintaining the patient in the perpendicular, and, at the same time seeing that the head is flexed and if necessary the jaw forward, the operator seated in front of the patient is able to apply force to the antero-lateral aspects of the thorax nearer the free than the articulated ends of the ribs, which gives the same obvious advantage which would result from trying to manipulate a door or other hinged object from a point distal rather than proximal to the hinge. The operator, to relieve himself of the fatigue of such a procedure carried on for some time, can easily maintain the position of the patient from the front, keeping the head flexed, while the assistant, relieved of that duty, by encircling the patient's thorax in the attitude of embrace, will be able to continue the rhythmic movements of the chest at as great a mechanical advantage as the operator in front; and here, too, the force is applied to the more movable portion of the thorax rather than to a point of relatively little movement, i. e. the postero-lateral aspect. When a chair is not available, as for instance in drowning cases, when artificial respiration must be performed on the ground, the operator and assistant can kneel or sit in comparative comfort; otherwise proceeding as described above.

During the performance of artificial respiration by this method the patient is at all times in the best possible position to respond to any efforts that may be made by the muscles to resume respiratory movements.

Role of the Heart.

It may be objected that I have not taken the heart into consideration in this discussion. I have not done so because it does not seem to me that the phenomena ordinarily observed in the course of ether administration are heart phenomena at all. Were I convinced that the phenomena were wholly due to failure of the heart I might adopt a different procedure. Or if, in the presence of both heart and respiratory manifestations, it seemed as though the respiratory phenomena were secondary to the heart failure, I doubt, even then, the advisability of adopting a procedure which no degree of hardihood would induce one to undertake were the patient conscious. Does any one think of forcing his conscious patient, gasping for breath on account of failing heart, to lie down? Would he ever under any circumstances invert his patient? Not only does the upright position seem safe to me, but experience has taught me that it is comfortable for the patient, the after discomforts, such as ether-back, ether-tongue, ether-jaw not being experienced.

Advantages of the Upright Posture.

The position offers numerous advantages from the operator's standpoint; the exposure is good, illumination is easy, hemorrhage, particularly venous oozing, is less troublesome than in the recumbent position; therefore less assistance is required, which is an important consideration when operating in so small a field as the nose and throat. Ether administration by any method in this position is easy; not infrequently the anesthetizer with whom I am accustomed to work, finds it convenient to hold the head during short operations, as for instance tonsillectomy and adenoidectomy, thus simplifying the procedure.

Never having had an ether death or a serious ether emergency in a period of twenty-two years, during which I have employed the upright position constantly, it is but natural that I feel like urging its more general use.

525 N. Charles St.

Discussion.

Dr. S. Griffith Davis, Baltimore, Md.: In anesthetizing for Dr. Sanger I have put to sleep patients of all ages, from infancy to senility, and they have represented every possible condition of comparative health and virulent disease. All sorts of heart lesions have been encountered, but only one cardiac patient caused us anxiety and that patient was operated in the recumbent position. Since then all cardiac patients, irrespective of their lesion, have been operated under general anesthesia in the upright posture. I have naturally been anxious about some of them although the position during operation was that which they assumed themselves in the wards and in bed. While we have had no occasion to use artificial respiration in the upright posture, I believe, with Dr. Sanger that the posture has advantages over the prone so far as resuscitation is concerned. I recall one patient, the wife of a doctor, who was persistently cyanotic under light etherization in the upright posture, but it afterward developed that she was susceptible to opiates and had had ¼ gr. of morphin, apparently enough to decidedly depress her respiration. Patients are anesthetized in the horizontal position, either with straight ether for children or gas-oxygen-ether sequence for adults, after which they are sat up in a straight-backed chair, and I take charge of the position of the head and assisting the operator while some one else carries on with the anesthesia. As Dr. Sanger uses periods of pressure during his tonsil operations, the closed cone method of etherization answers all requirements and the cone is simply reapplied, after the initial induction, during the time the operator is not working. Under continuous vapor anesthesia the operator gets a good deal of the anesthetic and this is another reason why Dr. Sanger prefers the closed cone for his cases. An open airway is maintained by keeping the tongue forward with a curved-blade retractor and the anesthesia is kept light enough not to abolish the laryngeal reflexes. As long as the coughing and swallowing reflexes are not abolished there is no danger of the patient inspirating blood or debris into the airway. Any swallowed blood is vomited when the patient is returned to bed, so swallowing a little of it does no harm. Anesthesia and operation in the upright posture is a good thing and should be more routinely used.

Dr. J. T. Gwathmey, New York City, N. Y.: I am rather surprised that Drs. Sanger and Davis have not availed themselves of the advantages of a French chair-table, which adapts itself so splendidly to operations under anesthesia in the upright posture. It is far superior to placing the patient in a straight-backed chair and assists materially in helping to maintain the patient's posture. As anesthetists we should encourage the use of the upright posture as it facilitates the administration and effectiveness of anesthesia on account of the cerebral anemia induced. The sequestration experiments and methods of Dawbarn are of interest in this connection. He found that by sequestrating part of the blood volume in one or more of the extremities that anesthesia could be far more readily induced and maintained and that recovery was far more rapid after the sequestrated blood was sent back into the general circulation. I cannot conceive that the upright posture is either the theoretical or practical one for resuscitation, although it may be the most convenient. The cases of apparent chloroform deaths which have recovered almost invariably are those in which the patients were at once put into the extreme head-down position. Whatever is to be done in the way of resuscitation by artificial respiration must be accomplished in a very few moments, and I would hesitate to trust to the upright posture during this precious period. At St. Bartholomew's special clinic for throat operations we have about eliminated the second stage of anesthesia by passing nitrous oxid-oxygen into an open mask. There is no break in this technic as in the closed method. Anesthol is used during induction, if desired, then the nitrous oxid-oxygen is passed through the ether to the open mask, on which some essence of orange has been dropped. Ninety per cent. of patients thus put to sleep do not so much as raise their hands. They may even be allowed to hold the mask to their face during induction, the method is so pleasant. Once surgical anesthesia supervenes anesthesia is continued through nasal tubes, the mouth-gag or whatever device the anesthetist and operator prefer. With this method the anesthetic technic requires so little of the anesthetist's attention that he can assist the operator by maintaining the position of the patient's head, by swabbing out or aspirating the blood and by counter pressure at the angle of the jaw. The anesthesia can be regulated to conserve the reflexes and it is usually so light that recovery is almost immediate on leaving the table or return to bed and the amount of postoperative attention or nursing is reduced to a minimum.

Dr. Sanger (closing): If the border line between the swallowing and coughing reflexes can be maintained the larynx will take care of itself and no inspiration of blood or debris will occur. Operator and anesthetist can keep tab on the perfection of their methods of operating and anesthesia by the incidence or absence of lung abcesses following their tonsil operations.

THE AMERICAN ASSOCIATION OF ANESTHETISTS WILL MEET IN NEW ORLEANS, APRIL 26-27, 1920, THE FIRST TWO DAYS OF A. M. A. WEEK. THIS—THE EIGHTH ANNUAL MEETING WILL BE THE FIRST ANESTHETIC RALLY EVER HELD IN THE SOUTH AND IT IS HOPED THAT SOUTHERN ANESTHETISTS WILL COOPERATE IN MAKING THIS MEETING A BIG SUCCESS. THERE ARE MANY SOUTHERN ANESTHETISTS WHO ARE NOT MEMBERS OF THE A. A. A. AND THESE SHOULD JOIN AT ONCE, AND HELP IN PROMOTING THE INTERESTS OF THEIR SPECIALTY.

UNDOUBTEDLY SOME OF THESE ANESTHETISTS HAVE BEEN MAKING INTERESTING AND VALUABLE RESEARCHES AND CLINICAL OBSERVATIONS. BY ALL MEANS THEY SHOULD PREPARE PAPERS ABOUT THEIR LATEST ACHIEVEMENTS AND REQUEST A PLACE ON THE PROGRAM FOR PRESENTING THEIR CONTRIBUTIONS.

IF YOU HAVE ANY SUGGESTIONS FOR MAKING THIS EIGHTH ANNUAL MEETING AN OUTSTANDING ONE, GET IN TOUCH WITH THE SECRETARY AT ONCE AND LET HIM HAVE THE BENEFIT OF YOUR IDEAS.

A SIMPLE METHOD OF ADMINISTERING ETHER WITH OXYGEN AND ITS ADVANTAGES.*

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In presenting this simple method of administering ether with oxygen and emphasizing its advantages, I do not pretend to advocate anything strikingly new or revolutionarily scientific. It is simply a commonplace and safe method of anesthesia which is easily taught and readily applied. While it is a method familiar to many anesthetists, I have always been surprised by the fact that it is so infrequently taught to interns or those being initiated into the specialty of anesthesia.

Perhaps someone in the discussion will throw some light on this neglect to include this safe and simple method among those routinely used in hospital service.

Be that as it may, the tendency, at present, is toward the use of such methods of anesthesia as are not only simple and safe, but more especially advantageous to the operator, so far as his surgical demands are concerned, as well as to the recovery of the patient. If there is any adjunct to general anesthesia more valuable to the welfare of the patient than the use of oxygen, I would like to know of it.

Those who use nitrous oxide-oxygen anesthesia extensively are decidedly appreciative of the potent influence which the oxygen element in this method of anesthesia exercises.

If any criticism is tenable against the anesthetist, it is the failure to carry this appreciation of the value of oxygen into the routine administration of other anesthetics.

With comparatively inexpensive supplies of oxygen now becoming more and more available and practical, the tendency toward a routine use of oxygen with all anesthetics is growing rapidly to the benefit of all concerned. It is no longer considered good anesthetic practice to limit the use of oxygen to conditions of embarrassed respiration or circulation or as a terminal remedy. Oxygen should be considered in the role of a stimulant and a prophylatic.

VALUE OF OXYGENATION.

While a great deal has recently been written into the literature of anesthesia on the subject of carbon dioxid, in its relation to anesthesia, acidosis and shock, the vital role of oxygen in conserving the proper oxygenation of the body during anesthesia has been more or less overlooked. With chloroform it is quite possible to reduce oxygenation to very imperiling degrees without establishing any external signs This holds good to a less extent with ethyl-chlorid, while with ether and nitrous oxid, more fortunately, cyanosis or asphyxia very promptly warn the anesthetist of any limitation of oxygen requirement. With ether and nitrous oxid, however, there is a deplorable tendency to permit long-continued, low-grade cyanosis without sufficient appreciation of the bad effects. Many cases of postoperative nausea, vomiting, acidosis and acetonuria are directly traceable to persistent, although scarcely noticeable cyanosis.

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* Read during the Seventh Annual Meeting of the American Association of Anesthetists, at The Breakers, Atlantic City, N. J., June 9-10, 1919.

While Henderson emphasizes the conservation of carbon dioxid tension to preserve the rose-pink color safeguard, it is quite remarkable how equally important proper oxygenation is in maintaining this satisfactory index of the patient's systemic reaction. Gwathmey, in a series of studies, has shown that oxygen increases the safety of all anesthetics without decreasing their anesthetic effect.

Vapor anesthesia, using oxygen as a vehicle, provides about as attenuated an anesthetic vapor as is consistent with surgical degrees of narcosis, although it is not at all difficult with ether-oxygen anesthesia to meet any requirements of the operator for sufficient relaxation. While experimentally there may be some objection to the use of pure oxygen as a vehicle for anesthetic vapors on account of the pulmonary effects in animals, apparently this objection is without force in clinical experience. There is no noticeable reaction on the part of the human lung to oxygenation. In fact oxygen may be injected into the tissues without any inflammatory reaction; this has recently been done for quick stimulating effect in pulmonary crises. Oxygenation may be said to be innocuous so far as any untoward effects are concerned.

INDICATIONS FOR OXYGEN.

I might emphasize the great importance of using oxygen in those cases in which it is especially indicated, but that would detract from my plea for its routine use in all cases. If it is necessary in certain desperate conditions of respiratory obstruction, cardiac decompensation, or marked depression from sepsis or shock, it is equally serviceable in the average anesthesia as a preventative of those disagreeable after-effects so common to cruder methods of anesthesia.

Cyanosis, regardless of its origin, is evidence that the respiratory function is greatly disturbed and is an S. O. S. call for oxygen. Similarly oxygen is indicated with anesthesia in all cases of shock, regardless of the cause, whether precipitated by trauma, hemorrhage, pain or sepsis.

Anesthesia is especially trying to the respiratory function in the extremes of life and oxygen is consequently especially gratifying in its effects when used in youth and old age. It not infrequently happens that operative procedures have to be abandoned on account of the excessive secretion of mucous in the young under crude methods of etherization.

It is quite surprising how oxygen as a vehicle for ether vapor prevents this complication and how useful it is in allaying the bronchial reactions of the aged under anesthesia.

There is no respiratory condition more disagreeable under anesthesia to patient and anesthetist than empyema. Under ordinary etherization the sensation of suffocation is extreme and the coughing excessive. With oxygen-ether vapor anesthesia, empyema operations are made safer for the patient and more satisfactory to both the surgeon and the anesthetist. It obviates the tendency of nitrous oxid-oxygen to exaggerate respiratory efforts. It is also a fact that only the most expert anesthetists are capable of handling empyema cases under nitrous oxid anesthesia and on this account the ether-oxygen technic is routinely preferable for the average anesthetist.

Another condition which ether-oxygen is especially indicated is eclampsia, although it is infrequently used for operations during this complication even in our best clinics. In view of the fact that etherization is almost universally used in the presence of eclampsia, it is all the more important to emphasize the value of ether-oxygen vapor anesthesia as against other methods of etherization. In fact, the oxygenation coupled with proper antiacidosis therapy will go far in tiding patients through the crisis of eclampsia.

Occasionally patients come to the operating room for tonsil and adenoid operations suffering for years from oxygen limitation, in fact their respiration is almost mechanically obstructed. In both types of patients it is equally important to provide for excess oxygenation.

It is also quite remarkable what a hemostatic effect oxygen has when associated with ether in tonsil and adenoid operations. Oxygenation will cause almost immediate clotting of the blood. This is very evident when using the suction apparatus.

Alcoholics are the bane of the anesthetist's existence. Their reactions to all sorts of anesthesia are anything but pleasant or convenient and I doubt if they become extinct when the prohibition wave strikes us July 1st, 1919. Few can handle alcoholics under nitrous oxid-oxygen, while many are prone to die under straight chloroform. An ethyl chlorid induction followed by ether, chloroform-ether, or better yet ether-oxygen vapor is an approach to an ideal anesthesia for alcoholics, as the leeway of safety is considerable while the potency of the anesthetic effect is sufficient to control even the most obstinate. One of the effects of alcohol itself is to produce continued cyanosis of varying intensity and the attending oxygenation clears up this complication.

ETHER-OXYGEN ANESTHESIA AS A ROUTINE METHOD.

Personally I use ether-oxygen vapor anesthesia as the method of choice in most operations demanding a prolonged narcosis. It is my decided impression that patients keep a better color, pulse and respiration than under most other forms of anesthesia. What is especially important is that any degree of relaxation may be secured without jeopardy to the patient's welfare and with entire satisfaction to the surgeon.

Ether-oxygen vapor anesthesia is perhaps the most serviceable method of anesthesia for taking care of the usual heavy work in large general hospitals. While there may be exceptions to its use, it fits most conditions more advantageously than any other routine technic of anesthesia to the entire safety and satisfaction of all concerned.

EQUIPMENT.

Fortunately ether-oxygen vapor anesthesia may be given with a very simple equipment, although experts in anesthesia have developed many ingenious devices for perfecting the administration for all possible conditions and purposes. The simplest and most practical method of procedure is to use the wash bottle attached to low pressure oxygen tank for the ether container. A twelve-ounce bottle two-thirds full of ether, is what I usually use. Not only will this amount of ether suffice for most any operative procedure, but this quantity is necessary to provide a proper strength of vapor. It is also important to carry the tube from the oxygen tank almost to the bottom of the wash bottle so that the oxygen will at all times bubble through a large quantity of ether. The tube from the bottle to the mask should be short, inside the wash bottle, and the bottle so placed that there is no danger of liquid ether being pumped to the patient. Care must also be exercised in connecting up the tubing from the tank and to the mask so that this accident will not occur. Be sure that everything works properly before applying the mask to the patient. The tubes projecting into and leading from the wash-bottle or ether container should be made of metal or glass, and fitted through the stopper in an air-tight manner.

The low-pressure oxygen tank is a convenient source of oxygen supply as its contents will serve for a number of operations; it is present in almost all operating rooms and its value and pressure admit of easy and delicate manipulation of the oxygen flow. For facility of transportation, use at the bedside, in the home, the clinic or office, small tanks of compressed oxygen may be used. The principal item of expense with oxygen is the cost of transportation.

In the teaching clinic, especially, the tank supply of oxygen is preferable to motor blowers for compressed air as it is noiseless and does not interfere with instruction, a point of considerable importance. Also the supply is far more dependable than that of air by means of an electric blower which is prone to get out of order. It is also preferable to air provided by hand-bulb or foot-bellows, as it makes no demands on the anesthetist's energy, attention or time. The turning of a valve is his sole anxiety. All his other faculties are concentrated on the patient's condition.

This modified Yankauer mask, which I have devised, is a very suitable one through which the patient receives the ether-oxygen vapor. The wire-mesh dome is perforated by the tube carrying the vapor. This tube is expanded into a perforated disk inside the mask and over the patient's nose and mouth. The tube is on a swivel and can be turned in any direction so that the tubing from the ether container is never in the operator's way. The mask is covered with the same amount of gauze used for the open drop ether method, and over this is placed a small rubber dam with an air vent one inch in diameter. This dam helps retain the ether-oxygen vapor and the air vent makes a convenient spot for the preliminary use of drop ether, ethyl-chlorid or C-E mixture for induction or supplemental anesthesia. A wet towel or gauze will serve the same purpose if the rubber dam is not at hand. No effort is made to effect an air-tight adaption of the mask to the face by means of cotton or an inflated rubber rim.

It is my impression that too close an adaptation of the mask exaggerates the respiratory effort, especially in anesthesia for abdominal surgery.

VALUE OF VAPOR DEVICES.

While the wash-bottle used as an ether container serves routine purposes, the substitution of a Gwathmey or Lumbard vapor apparatus admits of far greater possibilities in vapor anesthesia and perfection in the technic of narcosis for special operative procedures. By means of such vapor devices the strength of ether delivered to the patient may be more accurately regulated and controlled. Chloroform may be added as required, or ascending and descending percentage mixtures of chloroform-ether utilized as indicated or desired. These devices also provide for warming and moistening the oxygenated anesthetic vapor when desired. As a general thing I do not advise the induction of anesthesia by this method unless by chloroform. The induction would be too prolonged. It is far better to induce anesthesia with gas-ether and then switch to the ether-oxygen vapor when patient is well under. Ethyl-chlorid may be similarly used for induction.

Regulating Anesthesia.

The flow of ether-oxygen for maintaing anesthesia depends, of course, on the individual reactions of various patients to anesthesia. There are no hard and fast rules. The anesthetist must be guided by the signs and symptoms of anesthesia and the requirements of the operative procedure. Suffice to say that by regulating the flowing of the vapor anesthesia may be lightened or deepened with singular ease and facility.

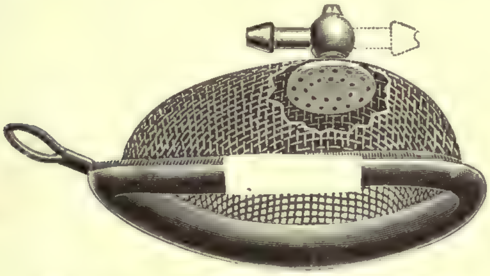
Fig. 1—Lumbard Mask for Vapor Anesthesia.

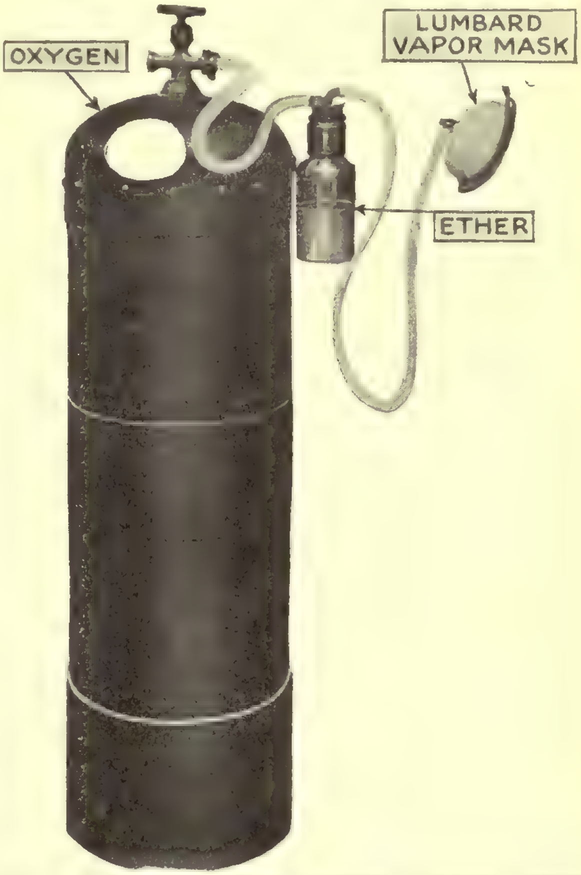

Fig. 2—Ether Oxygen Vapor Anesthesia Apparatus, connected to oxygen tank.

This method of ether-oxygen vapor anesthesia may be used for nose and throat operations and for intrapharyngeal anesthesia for all purposes, including thoracic and intro-thoracic surgery. In this connection it is important to emphasize the fact that the transition from the mask to the gag or intrapharyngeal tube must not be made short of surgical narcosis. With this method and under proper control the lungs may be distended or allowed to collapse, periodically, as may be required, during intrathoracic operations.

Conclusions.

While my observations and the apparatus presented may seem very commonplace, I have dared to present them because of their simplicity and more especially because they fit in so admirably with the work of instructing interns in better and safer anesthesia. The method and apparatus may be used routinely because the latter is obtainable in all hospitals and because the former is adaptable to the routine surgical procedures in the largest general hospitals. The great advantage of ether-oxygen anesthesia over all other methods of anesthesia is the wide range of safety and extended field of usefulness. Patients recover from its effects in a very satisfactory condition. There is little headache, nauseau, vomiting or depression. While cost should never be considered where the safety of patients is concerned, still ether-oxygen anesthesia is an inexpensive method. The amount of ether used by this method averages from two to three ounces per hour. The extra cost of the oxygen is nearly offset by this economy in the use of ether. The amount of ether consumed is no more than that commonly used with the gas-oxygen ether sequence. The ether-oxygen provides any degree of relaxation without jeopardizing the patient's welfare or chances of recovery. It obviates the dangers of respiratory obstruction, circulatory decompensation, shock, acidosis and sepsis by promoting hyperoxygenation at a time when the entire bodily economy would suffer from the effects of deoxidation. So far as my experience goes this method has much to recommend it and nothing against it. Can the same be said of other routine methods? I would like to go on record as predicting that the coming general anesthetic of choice for routine use will be some form of continuous, regulated ether-vapor with a high respect to oxygen.

While ether-oxygen vapor anesthesia may not be the ideal method of anesthesia for which we are all searching, it is so cheap, simple, safe, practical and efficient that I have no hesitation in recommending it for more extensive use and especially for pleading with you all to teach the method to those who give anesthetics under your supervision.

1925 SEVENTH AVE.

DISCUSSION.

DR. S. GRIFFITH DAVIS, Baltimore, Md.:—I have always been more or less an enthusiast about ether, particularly in sequence with ethyl chlorid or nitrous oxid for induction. I have also realized the advantages of a continuous flow of warmed ether-vapor for maintaining anesthesia at any level required by the operative procedure. Lately I have found it quite possible to provide a continuous flow of warmed ether vapor by the drop method. The ether is dropped from an oil-cup device, into a warming chamber, where it is immediately volatalized and carried to the patient by a current of air or oxygen or a mixture of the two. While the method and apparatus are not adapted to intratracheal anesthesia, they are suitable for any other technic. The device I am using now is a cylinder containing a water-jacket, heated by an electric lamp, surrounding a coil of tubes onto which the ether is dropped from the automatic cup to be vaporized. It takes some 15 minutes for the device to become heated to the proper temperature for use. The vaporized ether may be carried to the patient by means of a blower, bellows, low pressure oxygen tank or nitrous oxid tank. In using any degree of pressure it is necessary to divert part of it into the other container to avoid back pressure. The warmed ether or ether-oxygen vapor is sent through a short rubber tube to a good sized mask covered with gauze. The device may be used for oral and nasal methods of anesthesia with great facility and little manipulation; only the ether dropper and air or oxygen current requiring occasional regulation. The anesthetist is practically left care-free to act as an assistant to the operator.

DR. WM. B. HOWELL, Montreal, Canada::—How high may the temperature in the heater go without decomposing the ether. In using the Connell Anesthetometer I have found that if the heater is turned on for any length of time before the flow of ether is begun, that the ether is readily decomposed and formalin formed.

DR. S. GRIFFITH DAVIS:—Decomposition is apt to occur in any apparatus not dependent on a water-jacket for heating the ether vapor. Ether does not decompose short of the boiling point of water and in the device I have shown the electric lamp heating unit is so small that it cannot set the water in the jacket to boiling no matter how long it is kept turned on. Experiments have shown that ether vapor may be delivered to the patient with this device at about a temperature of 99°F.

DR. E. I. MCKESSON, Toledo, O.:—The heat required to decompose ether is something over 300°F. It goes almost without saying that oxygen should be used with every anesthetic. It should be remembered that cyanosis differs with ether and nitrous oxid. While there may be the element of limitation of oxygen present in each instance, with ether cynaosis there is depressed blood pressure, while with nitrous oxid cyanosis blood pressure is increased. Concomitant oxygenation is serviceable in those operative procedures in which the operator, on account of the necessary operative procedure induces suboxidation by closing the air way. In such cases thorough oxygenation conserves the oxidation requirements of the patient during the periods of embarrassed respiration. Oxygen is effective even in wet lung conditions.

DR. RAY A. RICE, Columbus, Ohio:—Having used oxygen with various anesthetics for a great number of years, I can quite agree with Dr. Lumbard's conclusions. Oxygen, probably shows at its best when used with ethyl chlorid, in which combination it entirely eliminates respiratory spasm, which is so prone to occur with ethyl chlorid alone or when diluted only with air. Concomitant oxygenation, also, always provides safer and more satisfactory relaxation. Personaly I now prefer the use of ether-oxygen by a method of rebreathing. The ether vapor is provided by a flow of oxygen through a Gwathmey three-bottle vaporizer, where it is warmed and moistened in the hot-water bottle, and thence passes into a rubber tube attached to a Coburn pharyngeal tube fitted with a rebreathing bag. After the induction of ether by the ethyl chlorid-ether or nitrous oxid-oxygen-ether sequence, the pharyngeal tube is introduced and the device stabilized on the patient's face by means of a forehead rest held in place with adhesive. The ether-oxygen vapor is then turned on and administered with whatever degree of rebreathing is desired or required. As the Gwathmey device also provides chloroform it may be added to the mixture in recalcitrant subjects, when the operator demands profound relaxation and abolition of almost all the reflexes. Previous to my service, lately, at the Walter Reed Hospital, Washington, D. C., the drop-ether inductions had required from 15 to 20 minutes. The preliminary use of ethyl chlorid, at my suggestion, cut down the induction period to less than 5 minutes. Ether-oxygen warmed vapor is peculiarly serviceable for anesthesia in long, difficult neural operations, with the patient in peculiar positions. It can be administered by nasal tubes strapped into position and with the anesthetist out of the operative field, but in touch with the patient by means of the stethoscope over the patient's heart. Also it lends itself admirably to use in extensive plastic surgery of the face and jaw in military hospitals. I have used the Lumbard vapor mask, for some years, but not covered with gauze, but with its mesh wire soldered into a solid top. I have also used the ether-oxygen vapor with a mask, provided with expiratory valves and rebreathing bag and have found this a valuable routine method.

DR. LUMBARD, (Closing):—The ground has been so thoroughly covered that I have nothing more to add.

THE ATTENTION OF ANESTHETISTS IS ESPECIALLY DRAWN TO DR. MILLER'S PAPER IN THE CURRENT ISSUE OF THE SUPPLEMENT. IT IS ANOTHER EVIDENCE OF THE INTERESTING MATERIAL THAT MAY BE DEVELOPED FROM ANESTHETIC RECORDS IF THEY ARE KEPT WITH SOME DEFINITE PURPOSE IN MIND. DR. MILLER HAS MADE HIS RECORDS SHOW SOME INTERESTING AND VALUABLE THINGS IN RESPECT TO BLOOD PRESSURE AND ALSO AGE IN SURGICAL PROGNOSIS.

IT IS OF INTEREST TO NOTE THAT ONE OF THE FIRST ACTIONS TAKEN BY THE RECENTLY ORGANIZED TOLEDO SOCIETY OF ANESTHETISTS WAS THE ADOPTION OF A UNIFORM ANESTHETIC RECORD TO BE USED BY ALL THE MEMBERS IN THEIR HOSPITAL AND PRIVATE WORK. IN THIS WAY RECORDS WILL ACCUMULATE VERY RAPIDLY AND SERIES OF 1,000 ADMINISTRATIONS AND RESULTS MAY BE FREQUENTLY STUDIED IN THE LIGHT OF NEWER PROBLEMS PRESENTING FOR SOLUTION.

IT WILL HELP THE SPECIALTY FOR OTHER ORGANIZATIONS TO FOLLOW THE EXAMPLE SET.

OBSERVATIONS ON INTRATRACHEAL ANESTHESIA IN NEUROLOGIC SURGERY.*

A. W. Adson, M.D.
Surgical Section on Neurology, Mayo Clinic,
Rochester, Minn.

Intratracheal anesthesia has a definite, but limited field of usefulness. Only a short time ago its use was advocated in operations on the oral cavity, tongue, larynx, chest, and brain, but a comparison of the inhalation drop method, with intrapharyneal and the intratracheal method, has resulted in the gradual abandonment of the latter except in an occasional chest operation, and in operations on the cerebellum, pons, and medulla.

Numerous observations have been made in neurologic surgical cases during convalescence. Only a few years ago, the mortality following such operations was very high, owing to faulty technic and improper anesthesia. It was not unusual for the patient to remain unconscious for from two to twelve hours after the operation. Three obvious factors are responsible for this:

1. The anesthetist did not take into consideration the effect of the concussion produced by the operative procedure on the cranium.

2. The effects of morphin administration, which disguises the exact stage of the anesthesia.

3. The improper administration of ether, due to the cramped position of the head and neck in operations on the cerebellum, pons, medulla, and cervical spinal cord.

The inhalation drop method of administering ether is superior to the intratracheal method in operations in which the head is permitted to lie on the occiput or on one side. The procedure is simple, is just as efficient as any other, and is not attended with any bronchial complication.

The amount of ether necessary for an intracranial operation is less than that required for an intra-abdominal operation of the same duration, because of the concussion which is produced in the manipulations to turn an osteoplastic flap, or to produce a decompression. The same point is emphasized in the fact that a skull fracture can be treated with the patient in a semiconscious state, without an anesthetic, and that a craniotomy can be done under a local anesthetic.

Morphin only adds to the narcotic state and, with the concussion, produces an unconscious state which is deeper than is indicated by the usual signs of anesthesia.

During operations on the cerebellum, brain stem, and cervical cord, the surgeon is compelled to place the patient in a prone position; this adds to the difficulty of ether administration, and changes have, therefore, been made in the cerebellar head rest, which will secure the head in any position desired, and will permit inhalation anesthesia as well as intratracheal anesthesia during the exposure of the cerebullum or brain stem.

TECHNIC.

The anesthetic is not begun until the patient has been placed on the operating table. The only preoperative preparation is a hypodermic injection of atropin. After the patient is anesthetized, the head is placed in position and benzin, iodin, and sterile linen are applied to the operative field. As soon as the operative procedures reach the cranium, the amount of ether is diminished until the patient begins to move. The anesthetist, therefore, has a new anesthetic level to follow, and must bear in mind the effects of the concussion in conjunction with the effects of the ether. Very little ether is necessary, in fact, it can be administered so lightly that, when the wound is closed, the patient is awake. It is well to have the patient soundly anesthetized before the intratracheal tube is inserted. The method of inserting the tube has been described by Robinson[1]; the machine used was designed by the writer and Little[2]. It consists of an ether chamber connected with a blower, which has a three-way valve, so the patient can get pure air or any degree of ether saturation that is desired. The safety valve is connected with a mercury manometer, which controls the intratracheal pressure. The administration of ether is controlled by a valve which the anesthetist manipulates to secure the desired amount of ether saturation.

Deep anesthesia should be avoided in neurologic operations, and intratracheal anesthesia should be resorted to only when respiratory difficulties due to the operative manipulations are feared.

Mayo Clinic

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[2]Adson, A. W. and Little, G. G.: Intratracheal anesthetic machine. Jour. Am. Med. Assn., 1918, lxx, 1746-1747.

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*Read during the Seventh Annual Meeting of the American Association of Anesthetists, Atlantic City, June 9-10, 1919.

American Journal of Surgery

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F. HOEFFER McMECHAN, A.M., M.D., *Editor*
Avon Lake, Ohio, U.S.A.

OCTOBER EDITORIALS. 1919

POSTOPERATIVE ANALGESIA.

Writing in the *Boston Medical and Surgical Journal,* May 15, 1919, and speaking later before the Joint Meeting of the Interstate Anesthetists and the American Association of Gynecologists and Obstetricians, at Cincinnati, September 15, Dr. Bertha Van Hoosen, of Chicago, has drawn renewed attention to the importance of postoperative analgesia. She contends that:

"It would seem at times as though the surgeon, the obstetrician, and even the family physician regards the relief of pain more as a means of facilitating his work rather than a method by which to preserve the strength and increase the recuperative power of the patient.

The surgeon insists upon a profound anesthesia for the operation, which is only ten to thirty minutes in length, but leaves no orders for the relief of postoperative pain; or, if he gives such an order, it is not carried out until the patient is exhausted and crazed with the pain, and the relief is only for a short time.

The obstetrician leaves the patient to suffer for many hours without even the support of his presence, and at last at the close of labor gives an anesthetic for from five to thirty minutes.

Even the family physician is warned against giving morphin lest he may obscure the diagnosis, or lead the patient into a narcotic habit.

Lessened mortality has been, up to the present day, the first aim of the medical man, and lessened morbidity the last. That morbidity and mortality are twin sisters is to be demonstrated by the physicians of the future.

We have a few already pointing the way. Most prominent among these is Dr. George Crile of Cleveland, who has taught us that pain and anxiety as also thirst and insomnia, can do irremediable damage to the brain. Professor Kronig has brought to the field of obstetrics that much abused term "Twilight Sleep," which has proved such a boon to the modern mother. So successful has it been that delicate women have been kept free from pain for one or two days, and by its use the exhausting effects of a long and tedious labor have been avoided and the patient wakens with a sense of well-being and of having had a refreshing sleep.

Hoping to obtain for postoperative patients a condition similar to the obstetrical twilight sleep of Kronig and Gauss, 452 patients were given the following routine treatment after operation: $^1/_{32}$ of morphin and $^1/_{200}$ of scopolamin every four hours by hypodermic injection for 24, 36, and in very painful cases, 48 hours after operation.

The hours chosen for the administration of the postoperative scopolamin and morphin were twelve, four, and eight A.M. and P.M. Where a number of patients were receiving this treatment it facilitated the work of the nurse to have the doses for all of the patients at the same hour. As patients slept more soundly just after the hypodermic injection and were more wakeful the hours preceding, these special hours mentioned above were found to be advantageous, for it left the patient sleeping during the serving of dinner and supper and during the hours for morning hard work, and awake during visiting hours, between 2 and 4, and 7 and 8 P.M.

The following report of 452 patients was compiled by my assistant, Dr. Martha Welpton, from the records of the patients in the Mary Thompson and Cook County Hospitals during the year 1916:

Under "Sleep" the cases are listed as slept well, fairly well, or poor. The first and second nights are giving separately.

"Pain,"—anything which might cause patient to complain, as gas, headache, wound, etc. "Emesis" covers any nausea or vomiting during the first two

MARY THOMPSON HOSPITAL

		Sleep						
No. of Patients		Poor	Fair	Well	Pain	Emesis	Respiration	Pulse
200	1st night	28 (14%)	107 (53.5%)	65 (32%)	46 (23%)	77 (38.5%)	62 (31%)	99 (45.5%)
	2nd night	15 (8%)	82 (41%)	101 (50.5%)				

COOK COUNTY HOSPITAL

		Sleep						
No. of Patients		Poor	Fair	Well	Pain	Emesis	Respiration	Pulse
252	1st night	40 (15.4%)	106 (42.6%)	108 (42.6%)	33 (13%)	93 (37%)	4 (1.5%)	136 (53.9%)
	2nd night	20 (7.7%)	87 (34.5%)	145 (57.8%)				

days, even though it were but a mouthful, and but once.

"Respiration" shows a record of respiration under sixteen during the first twenty-four hours. None was found during the second twenty-four hours.

"Pulse" shows record of pulse above 100 during the first twenty-four hours.

Mary Thompson Hospital.

Two hundred consecutive cases operated and given postoperative doses of morphin $^1/_{32}$, scopolamin $^1/_{200}$, for from twelve to forty-eight hours. Thirty-six hours, or until midnight of the second day, was the usual time.

Cook County Hospital.

Two hundred and fifty-two consecutive cases operated and given postoperative doses of morphin $^1/_{32}$, scopolamin $^1/_{400}$, for from twelve to forty-eight hours. Thirty-six hours, or until midnight of the second day, was the usual time.

Patients at the County Hospital were given the postoperative dose of scopolamin $^1/_{200}$ and morphin $^1/_{32}$, but it was soon discontinued and scopolamin $^1/_{400}$ was substituted for the $^1/_{200}$ on account of the patient occasionally getting out of bed or showing signs of mild delirium, and thereby requiring extra attention from the nurses.

These reports, although very satisfactory, do not begin to compare with the verbal reports given by patients themselves just before leaving the hospital. For the benefit of the post-graduate visitors it has been customary to interrogate patients as to whether they had any nausea or vomiting, and as to the amount and severity of pain following operations. It is often surprising to receive a denial of any stomach disturbance or any pain whatever since the operation, but on referring to the charts, there would be found a record of vomiting or complaint of gas pains or an enema for gas pains. On questioning the patient more closely as to details of happenings during the first two days following operation it became evident that the patient had not only marked and prolonged analgesia but also some amnesia.

Postoperative analgesia is most beneficial to patient and nurse alike. To the patient because it shortens convalescence and leaves no dread of future operations. To the nurse because it enables her to care for her patient as she cares for a healthy infant, there being no necessity for giving moral support or enforcing discipline, and the nurse may sit and read or doze for many hours during the day and pass her nights with comparatively little disturbance. In fact, when a patient is not able to afford a special nurse for more than two or three days, if postoperative analgesia is employed, the patient is advised to have the special nurse the last few days in the hospital, when attractive trays and getting out of bed several times a day add so much to the patient's comfort."

Newer Apparatus

Editor's Note: From time to time this Department will publish Illustrations and Technical Details of the Newer Apparatus for Anesthesia and Analgesia.

AN APPARATUS FOR PHARYNGEAL NITROUS OXID-OXYGEN ANESTHESIA.*

George W. Tong, M.D.,
Brooklyn, N. Y.

Satisfactory nitrous oxid-oxygen anesthesia depends largely on the proper apparatus and the most important item in this is an arrangement to maintain an air-tight joint over the air passages and have perfect control of the air (or oxygen) in the aesthetic mixture.

No perfect device has been suggested yet, but in the dossal position any of the ordinary face pieces may be made to fit satisfactorily after proper adjustment. However, in operations in the prone position, in operations on the head, face or neck, and in prolonged operations which tax the patience of the anesthetist in keeping the face piece accurately in place, the apparatus devised for use at

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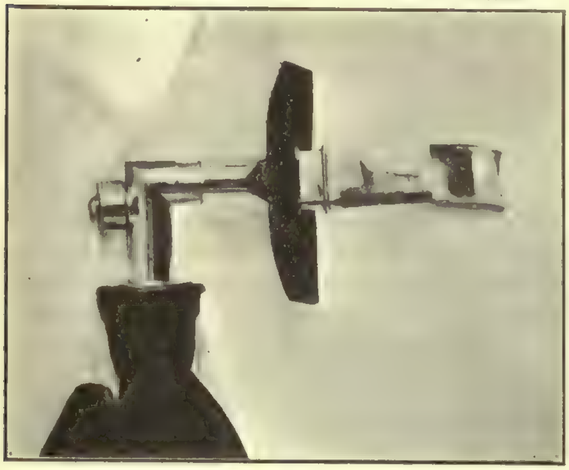
*This device was made for the author and used by him with success while working at General Hospital No. 1, U. S. Army. Authorized for publication by the Surgeon General's Office.

U. S. Army General Hospital, No. 1, and shown in the accompanying photographs has proved completely satisfactory during a prolonged experience with it.



The apparatus consists of a pharyngeal breathing tube, to which is attached by a slip joint a right angled hollow tubing of sufficient length to extend beyond the nose, with an expiratory valve located just beyond the angle. Exclusion of the outside air is effected by the rubber cuff fitting the tube closely and laid between the gums and cheeks, and by plugs of cotton in the nostrils.

The induction is carried through to complete anesthesia with the ordinary face pieces. When the pharyngeal reflexes are dulled, the pharyngeal tube is inserted, the rubber cuff set in place in the mouth and the nostrils plugged; thereafter the anesthetist has no worry over an obstructed air way and has simply to regulate the gases to suit the operative condition.

519 Third St.

Abstracts

A Résumé of the International Current Literature of Anesthesia and Analgesia

Subconjunctival Injection of Cocain for Cataract and Glaucoma Operations. J. Santos Fernandez and F. M. Fernandez. *Cronica Medico-Quirurgica,* Havana, February, 1919.

Santos Fernandez says that these operations can be done without subconjunctival injection of cocain, but if one wishes to omit nothing that will aid in rendering the operation a success, this is certainly to be recommended. He injects 0.005 gm. of morphin half an hour before the operation and repeats it after the operation, as it is very important to keep the patient in a tranquil frame of mind. To aid in this he does not set a day for the operation, but keeps speaking of preliminary things that have to be done, and the operation can then be performed whenever most convenient and without apprehension on the patient's part.

Spinal Anesthesia. H. P. Achard. *Progrès Medical,* Paris, June 21, 1919.

Achard states that he has applied stovain low rachianesthesia in 123 cases and procain anesthesia in 290—thus well over the 400 mark. There were no fatal accidents and no durable injury in any case, but some disturbances developed within an hour or during the three following days in a few. Analysis of these cases demonstrates, he says, that the only failures were due to defective technic, and with greater experience they grew less frequent. The only mishaps were transient headache indicating slight irritation of the meninges. This was noted in 10 per cent. of the procain cases and in 50 per cent .of the stovain cases. The few cases in which an English make of procain was used all developed headache or pain in the spine; in two cases the latter kept up for five days. Postoperative vomiting and nausea for a few minutes were noted in 10 per cent. of all the cases, and a tendency to brief syncope was evident in 4 per cent. of the procain and in 10 per cent. of the stovain cases. Incontinence of the sphincters is annoying. It occurred in 50 per cent. of stovain cases but less frequent with the procain. The operations were all below the umbilicus and no attempt was made to have high anesthesia.

Conductive Anesthesia by Intrasacral Extradural Injection of Procain. S. A. Meaker. *British Medical Journal,* May 10, 1919.

The method described by Meaker is said to be a new one. When procain is injected extradurally into the bony canal of the sacrum, anesthesia of the third and lower sacral and coccygeal nerves is produced. The motor roots are not affected, and retention of urine after hemorrhoid operations done with sacral injections is neither more nor less common than when a general anesthetic is given. The regions supplied by the first and second posterior sacral nerves may undergo a paresthesia, but they are not anesthetized. The field of usefulness for sacral anesthesia is said to comprise operations for hemorrhoids, fistula and other conditions in and about the anus. In some cases the anesthesia is limited to a circle around the anus 3 or 4 inches in radius, while in others almost the whole of the buttocks may be analgesic. There is usually bilateral symmetry of effect. The lower rectum is anesthetized for at least 3 inches above the anus. The injection is to be made through the approximate center of the sacral hiatus.

Circulation in Shock After Abdominal Injuries. J. Erlanger, R. Gesell and H. S. Gasser, St. Louis. *American Journal of Physiology,* Baltimore, June 1, 1919.

In an investigation made by Erlanger, Gesell and Gasser the changes in circulation occurring during the development of shock brought on by exposure and manipulation of the tubes are as follows: The arterial pressure at first may be lowered but little, if any. After some time, it may be after some hours, the pressure begins to fall, and this fall continues more or less steadily, though often slowly, until the animal dies. The changes occurring in the systemic venous pressure have been so small that they cannot be regarded as significant, excepting, perhaps in demonstrating that cardiac failure has little, if anything, to do with the failure of the circulation. The portal venous pressure falls continuously, though slowly, during the first two or three hours. It then ceases to fall or actually rises slightly until the arterial pressure has reached a comparatively low level, when the portal pressure again begins to decline. The peripheral resistance, both somatic and splanchnic, at first practically invariably is increased. At about the time the arterial pressure begins to fall, or starts on its steady decline, and also at about the time the portal pressure starts to rise, the peripheral resistance begins to diminish and by the time the arterial pressure has reached the vicinity of 50 mm. Hg, the peripheral resistance practically invariably is below normal. But up to the time of death the vessels and the vasomotor center preserve some residual tone, though slight reactivity. In this respect the findings of Bartlett are completely confirmed. A considerable loss of fluid from the exposed bowel occurs as a result of transudation through the serous surface, and presumably into the tissues also. The capillaries and veins of the intestinal villi are greatly distended and tightly packed with red corpuscles. No positive evidence has been obtained that the efficiency of the heart is impaired during the development of shock. Nevertheless, although the heart is capable of raising the arterial pressure as high as the normal heart can, the authors are inclined to believe that the heart in shock cannot maintain high pressures as long as the normal heart can. The initial changes in the circulation can be explained best on the assumption that the effective blood volume is reduced. The loss of fluid into and through the tissues of the bowel and the sequestration of blood in the intestinal capillaries and venules suggest a mechanism through which a reduction in blood volume might occur.

Local Anesthesia of Uterus. Prof. Ando. *Japan Medical World,* Tokyo, July 6, 1919.

By means of the vaginoscope the orifice of the uterus is exposed and the anesthetics are injected with a 5 gram syringe at posterior, anterior and bilateral points along the border of the cervix and the vaginal wall. The needle is driven toward the base of the cavity for a distance of 2 mm. and the injection is made very slowly. The operation is begun in about five minutes after the injection. By this method all the operations on the mucous membrane of the vagina and the uterine cavity may be carried out without applying general anesthesia.

Effect of Cocain Hydrochlorid on CO_2 Production. S. Niwa, Chicago. *Journal Pharmacology and Experimental Therapeutics,* Baltimore, January, 1919.

The results of Niwa's experiments support the statement that the local anesthetics, cocain hydrochlorid, affects the metabolism of the mixed nerve in exactly the same manner as do general anesthetics, namely, primary stimulation by a weaker concentration, and subsequent diminution of the CO_2 production by a higher concentration. These facts demonstrate that there is a close relationship between the rate of nerve metabolism and the state of excitability of the nerve, and suggest that anesthesia in general is probably brought about by interference with the tissue metabolism.

Action of Local Anesthetics on Striated Muscle. S. Kubota and D. I. Macht, Baltimore. *Journal Pharmacology and Experimental Medicine,* Baltimore, April, 1919.

The action of a large number of local anesthetics on excised skeletal muscles of the frog and the rat was studied by Kubota and Macht. It was found that all of the substances studied depressed the excitability and the contractility of striated muscle and caused a quicker onset of fatigue. No primary stimulating effect was noted after the exhibition of even very small doses of cocain or local anesthetics. Of the decomposition products of cocain, ecgonin was found to be a powerful depressant, while benzoyal ecgonin was only very slightly depressant in its action, and sodium benzoate and methyl alcohol produced practically no effect. The stimulating effect of cocain on muscular work, therefore, cannot be due to its peripheral action on the muscles themselves, but must be ascribed to a central action.

Traumatic Shock. E. Quenu. *Revue de Chirurgie,* Paris, September-December, 1918.

Quénu refers to the traumatic toxemia with its set of symptoms indicating depression of the vital processes while the mind is not impaired. He devotes 236 pages to analysis of the literature on the subject published by the Allies, thus compiling for future investigators the data on the subject accumulated during the war. The number of clinical observations published was comparatively small, but they brought about the revolution in the conception and treatment of shock. In the surgical posts at the front, traumatic shock sometimes was responsible for the death of more than half of those that could not be moved. He adds that when for special reasons it is impossible to remove the focus, instead of mere expectancy, we might temporarily fasten the toxins in situ, as Heitz-Boyer did in one case in intense traumatic shock, filling the largest of the three large wounds with a solution of formaldehyde and methylene blue and giving copious hypochlorite irrigation.

Locrimal Gland in Surgical Anesthesia. L. T. Rutherford. *Lancet,* London, May 10, 1919.

The secretory activity of the lacrimal glands is regarded by Rutherford as a valuable sign in guiding the administration of anesthetics. If the anesthetic is administered in quantities just calculated to abolish the lacrimal secretion, and then wait, if at any time in doubt, until the secretion again appears, Rutherford feels confident that he is well on the safe side of the border-line between deep surgical anesthesia and an overdose. The exhibition of such drugs as morphin, scopolamin and atropin in a large number of cases completely abolishes the lacrimal secretion. In the course of the investigations undertaken to establish the reliability of the lacrimal activity as a means of regulating the amount of the narcotic employed, over 200 cases were anesthetized for operations varying in severity from the opening of a superficial abscess to the resection of several inches of intestine. When chloroform is administered alone the quantity of the lacrimal secretion is usually small, but in uncomplicated cases it is at once evident. During the administration of ether the lacrimal secretion is abundant, and in giving mixtures containing ether the secretion does not fall much below that when ether is given alone. Rutherford insists that the appearance of a lacrimal secretion during anesthesia is a constant phenomenon; it bears a definite relation to the depth of narcosis; and, since the exceptions to the general rule are easily recognized, the value of this sign must be at once apparent.

Spinal Anesthesia. V. Riche. *Presse Medicale,* Paris, April 28, 1919.

Riche says that he has applied general rachianesthesia *par la voie lombaire* in 60 cases out of a thousand in which he has used ordinary spinal anesthesia. The latter permits all operations under the diaphragm, but with a modified Jonnesco and Le Filliatre technic he performed operations on the neck, chest and arms. In 3 of the cases there was a tendency to partial narcosis, but most of the time the patients were able to converse with the nurse in charge. In 30 per cent. of the cases there was transient retching from twenty to thirty minutes after the injection. With his modified technic, the dose of procain (novocaine) was 1 cg. per 5 kg. of the body weight. The puncture is made in the first or second lumbar interspace, the patient lying on his side, withdrawing 10 or 15 c.c. of the spinal fluid. Then the anesthetic in an 8 per cent. solution is very slowly injected. He never uses epinephrin with it, but in the course of the injection he draws some of the spinal fluid up into the syringe several times to mix it well with the anesthetic. He declares that this technic can compete on an equal footing with general anesthesia and blocking the trunk nerve, but local anesthesia is preferable to all other technics when conditions permit it.

Tremor During General Anesthesia. T. REITZ. *Hygiea,* Stockholm, April 15, 1919.

Rietz noticed in 28 cases the development of a tremor during general anesthesia which resembled in character and course the rhythmic phenomena observed at times with irritation of motor tracts. His study of its mechanism revealed a means to control it, namely, by shutting off partially from the brain the blood laden with the anesthetic. This he accomplished by pressure on the carotid artery. The tremor ceased at once in 16 of the 25 cases in which this was done and it became much reduced in 4 others, but no effect was apparent in the 5 others.

Operations on Diabetics. L. BLUM. *Paris Medical,* May 3, 1919.

Blum distinguishes between the surgical affections which are quite independent of the diabetes and those connected with the disease. The general rules of surgery apply to the former, but with the lesions determined by the diabetes or connected with it, preliminary dietetic treatment is imperative. In the milder forms of diabetes, the results can be only favorable. In the graver cases, energetic dietetic treatment should be given for forty-eight hours at most, carbohydrates one day, fasting the next. Then the operation should be done without further delay if it is deemed wise to attempt it at all. It has been his experience that surgical complications set up a vicious circle in diabetes. His experiments and clinical research have shown further that chloroform is especially harmful and should never be used for diabetics. Diabetic coma after ether is also not infrequent, although many surgeons have performed successful operations under ether. Local and spinal anesthesia would be preferable if it were not for the emotional shock of the intervention which counterbalances the advantages of abstention from general anesthesia. Sodium bicarbonate should be given by the mouth or vein as long as the danger of coma persists.

Subcutaneous Ether-Oil Anesthesia for Guinea-Pigs. J. T. GWATHMEY. *New York Medical Journal,* July 19, 1919.

Many animals during the war were required in both medicine and surgery in the effort to conserve the life of the soldier. The blood of guinea-pigs and rabbits was used extensively in the production of reagents for the Wassermann reaction, and the blood of rabbits was used in the production of diagnostic serum. Dogs and cats aid in the decision of many problems concerning the badly wounded soldiers, such as shock, or the choice of one of several operations. It is desirable to anesthetize these animals in the most humane, the simplest, quickest and safest way. These requirements have been met by the subcutaneous injection of ether and oil. After various modifications, the technic, as finally employed, consisted in giving the injection just back of the neck, against the direction of the hairs, which are not removed. The following doses have been determined for guinea-pigs: For each 100 gm. of body weight, 85 per cent. ether with 15 per cent. olive oil was the mixture used in the experiments. Maximum safe dose—anesthesia of one to two hours: 0.74 c.c. of ether, or 0.87 c.c. of 85 per cent. ether and 15 per cent. of oil mixture (or 1.00 c.c. of 75 per cent. ether and 25 per cent. oil mixture). Medium dose—anesthesia for about one hour: 0.55 c.c. of ether, or 0.65 c.c. of 85 per cent. and 15 per cent. oil mixture (or 0.72 c.c. of 75 per cent. ether and 25 per cent. oil mixture). Minimum practical dose—anesthesia of about thirty minutes: 0.46 c.c. of ether, or 0.54 c.c. of 85 per cent. ether and 15 per cent. oil mixture (or 0.60 c.c. of 75 per cent. ether and 25 per cent. oil mixture).

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SURGERY IN DIABETICS.

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There are few situations more delicate than that of the physician who has to assume responsibility for surgical intervention in a case of diabetes. Should the patient be operated upon? Is there less danger in temporizing than in operating? What anesthesia should be used? What pre- and post-operative treatment should be followed. These are serious questions, difficult to decide, because many points are not yet settled in spite of important contributions, by Becker, Naunyn, Ruff, Karewski, Berger, Poucel. I propose simply to state the problem and to present certain indications, based upon rather numerous observations.*

The main conditions rendering operations in diabetics dangerous are: 1, Hyperglycemia; 2, Acidosis. I do not mention the dangers due to vascular lesions, because while these occur frequently in diabetes, they are not essentially diabetic lesions; they are due to associated conditions (syphilis, arteriosclerosis, Bright's disease); gangrene due to endarteritis in the extremities does not occur in young subjects with severe diabetes, but in the moderate diabetes of stout subjects, suffering from venal sclerosis.

I. *Hyperglycemia.* Hyperglycemia favors suppuration. Some years ago, this was the main dread of the surgeons; Roser, Israel, König, had insisted upon the necessity of reducing the hyperglycemia before operation, by a suitable diet. Today suppuration is less feared; in aseptic operations it is rarely a fatal complication, numerous cases of healing by primary intention could be cited; in order to cause suppuration, there must be not only a predisposition, but bacteria, and the surgeon does not usually introduce them.

Complications resulting from hyperglycemia, while they often delay the cure, are practically never fatal. They can be prevented by reduction of the hyperglycemia and glycosuria, by appropriate diet; carbohydrate restriction. This preventive treatment is especially useful, when surgery is performed in areas like the perineum, subject to soiling by the urine.

When the surgeon is faced by suppuration (phlegmon, carbuncle, moist gangrene), requiring immediate surgical intervention, the hyperglycemia must be reduced as quickly as possible. It is here, that the absolute fast, with or without purgation is of great assistance; the aggravating action of fasting upon acidosis, should not be feared. This has been considerably exaggerated. I have observed cases of diabetic acidosis, in which fasting diminished the ammonuria and acetonuria.

II. *Acidosis.* This is a much more serious menace. It causes post-operative coma, and speeds the death of many diabetics. Hoffa has cited striking cases of post-operative coma, in cases which were sugar-free after diet. Death surpervened in one day, sometimes more slowly or occasionally at the end of several hours, the subject never awakening from the anesthesia and falling thus into coma.

Numerous conditions affect the course of post-operative acidosis; these are the severity of the diabetes, the nature of the operation performed, the anesthetic employed, and the treatment followed.

1. *The severity of the diabetes.* In diabetics, suffering from emaciation and acidosis, the slightest operations are dangerous; chloroform is almost fatal; a simple incision, even without anesthesia, may lead to coma.

In diabetics without emaciation, but in an attack of acidosis, the danger is also very great, but the resistance is better. Many such subjects survive after operations under general anesthesia.

In diabetics without emaciation or acidosis, coma, as a rule need not be feared; but it should not be forgotten, because operation under an anesthetic may cause the appearance of acidosis in a subject who did not present this symptom before operation. I saw such a complication, in a diabetic woman, who had been under chloroform one hour, for a perineorrhaphy. Before the operation, her urine contained no diacetic acid; at the end of the operation, a catheterized specimen of urine gave a strong Gerhardt reaction; for three days the patient was in danger, but thanks to energetic alkaline treatment, she recovered and several days later the acidosis diminished and then disappeared.

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*Labbé, La chirurgie chez les diabetiques. Academie de Médecine, 19 Mai, 1914.

Thus the pre-operative condition of the patient assists in determining the prognosis. Three degrees of severity can be distinguished: 1, diabetes with emacination and acidosis; 2, diabetes without emaciation but with an attack of acidosis; 3, diabetes without emaciation or acidosis.

2. *The Nature of the Operation.* The nature and the gravity of the operation are conditions which influence the danger of acidosis. Extensive operative traumata and operations requiring a long time, are most to be feared. Pre-operative anxiety caused by fear of the knife may also play a part; I have seen one case in which such anxiety was the cause of a severe attack of acidosis in a diabetic without emaciation. Acetone rose from 0.32 to 0.51, and diacetic acid which was not present before, appeared in the urine. But, in fact, the anesthetic is more dangerous than the knife in operations upon diabetic subjects.

III. *The Anesthetic.* The most dangerous anesthetic is chloroform. It may even produce mild acidosis in non-diabetic subjects. Rolland has reported frequent acetonuria and occasionally diacetic acid in the urine, following chloroform anesthesia; Baldwin has seen acetonuria as a result of chloroform and other anesthetics. As a matter of fact, in subjects who have neither diabetes nor liver disease, acidosis is simply a matter of record; I have often looked for Gerhardt's reaction, without ever finding it.

From another angle, Nicloux, who has studied the decomposition of chloroform in the tissues, has reported that it is accompanied by extraction of alkali from the tissues in considerable proportion, with a consequent tendency to acidification. If the organism is healthy, it counteracts the acidosis and repairs the loss, but this does not occur when the organism is sick.

Even in diabetics without loss of nutrition, chloroform may produce acidosis. In cases presenting no emaciation and slight acidosis, chloroform aggravates the intoxication and may precipitate coma, but in any event recovery may take place; I have seen such a case recently,—a woman who underwent amputation of the forearm, necessitated by a very severe phlegmon, now has a perfectly healed wound; she still has glycosuria, but no acetonuria.

In diabetics with malnutrition and acidosis, chloroform is fatal. Chloroform should also be feared in subjects with liver lesions. The toxic action of chloroform on the liver has been ably demonstrated by the researches of Doyon, N. Fiessinger, Chevrier, R. Bénard and Sorrel, Rolland and the observations of Quénu. Severe icterus has been seen to follow chloroform anesthesia, and I have seen several cases of hepatic insufficiency with or without icterus, which caused rapid post-operative death; hepatic necrosis has been produced experimentally in animals, and finally the following substances have been found in the urine of patients operated upon under chloroform; urobilin, albumin, biliary pigments, acetone, glucose (or the possibility of provoking alimentary glycosuria by ingestion of sugar); these are indications of serious functional disturbances of the liver. The tendency of chloroform to injure the liver, is one of the chief reasons for the gravity of operations upon this organ.

Ether is supposed to have to have a less toxic action than chloroform. But one cannot depend on this, for I have seen ether cause the death of a patient, a diabetic, without emaciation, but in an attack of acidosis, for whom the most careful pre- and post-operative precautions had been taken.

Prolonged ethyl chloride anesthesia seems to be the best tolerated by diabetics. I have seen a diabetic without emaciation, withstand remarkably well an anesthesia lasting 55 minutes, under ethyl chloride, for mastoidectomy; he had previously shown traces of diacetic acid in the urine; not only was he free of post-operative complications. but the day after the operation the diaceturia was no longer present.

Boureau, who has had wide experience in prolonged ethyl chloride anesthesias, told me that he had anesthetized 17 diabetics by this method. Six of these had acetonuria. The operations were of a serious nature lasting twenty to sixty minutes, and requiring the use of 35-100 cc. of ethyl chloride. A number of these patients were of advanced age. In spite of all this he had not a single death.

Spinal anesthesia by lumbar injection of cocaine or novocain is preferable to ether or chloroform in diabetics.

It was well withstood by a patient who underwent disarticulation at the knee for gangrene. No reaction of acidosis appeared in the urine.

Local anesthesia, by means of the subcutaneous injection of cocaine or stovaine, or novocain is the method of choice to be employed in cases of diabetes. I have seen it well tolerated by many patients. It does not provoke acidosis. Professeur Réclus has told me that he obtained excellent results with it, in amputations upon diabetics.

IV. *Pre-operative and Post-operative Treatment.* Vegetable diet (dry legumens, oatmeal) or milk diet, either of which counteract acidosis; the administration of a large dose of bicarbonate of soda before the operation may diminish the danger of acidosis. The following case observed at the Dubois hospital furnishes a good example. This diabetic with acidosis had to undergo at a few days interval, two successive amputations, for gangrene of two toes. The two operations were identical. The first time I gave him 30 grams of bicarbonate of soda before the operation. The result was excellent; the second time this precaution was negnected and the patient went into coma and died.

It has been suggested that preventive injections of glucose be given to combat acidosis; this may be of use in healthy subjects who can utilize the glucose, but in diabetics who do not burn the sugar, I see no advantage; on the contrary it seems quite disadvantageous.

Surgeons seem to be agreed on this point,—not to subject patients about to be operated upon to an unnecessary fast. Certain of them even give preoperative doses of sugar, in non-diabetic subjects.

Even if the main lines of prognosis are known, it does not follow that cases always take the cause indicated in the examples given. There are always unforeseen accidents and successes, in as much as we are still in ignorance of many of the conditions affecting acidosis. However, one cannot be too careful or too cautious, or too conservative about surgical intervention and especially of general anesthesia in diabetic patients.

Conclusions. The following rules seem to me to be the best guide in cases of diabetes where surgical intervention is necessary.

1. Only those operations should be performed which are absolutely necessary. Particular caution should be used in cases with acidosis. However, it is better to operate, than to allow an infection to become generalized which may kill the patient by septicemia or the acidosis which it provokes.

2. The operation if not urgent, should be preceded by treatment directed against the hyperglycemia and the acidosis. The treatment has the following basis: 1, mixed diet with little meat and reduced carbohydrate (if there is no acidosis) so as to reduce the hyperglycemia; 2, diet of dry vegetables or oatmeal, or milk if there is acidosis; 3, the administration of bicarbonate of soda in sufficient dosage to render the urine alkaline.

3. Immediately before the operation the fast should be lifted. The patient may also be given 40 grams of bicarbonate of soda.

4. The choice of anesthetic is of great importance. The following are preferred: Local anesthesia with cocaine or its substitutes; if this is impossible, spinal anesthesia; if general anesthesia is necessary use ethyl chloride; in cases of diabetes with acidosis neither chloroform nor ether should ever be used.

5. After the operation, bicarbonate of soda should be given by mouth, or if this is impossible by intravenous injection in sufficient quantity to render the urine alkaline. If there is severe acidosis 100 grams may have to be given. As soon as the patient can eat, he should be given vegetable broths, oatmeal soup, purées of dry vegetables, or milk. The alkaline treatment should be continued until all reactions of acidosis have disappeared.

THE TREATMENT OF MAXILLO-FACIAL INJURIES IN THE ZONE OF THE ADVANCE.

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During the time the junior author served in the British Expeditionary Force in 1915-1916, a certain period was spent in a Base Hospital devoted almost exclusively to the treatment of jaw injuries.

When these cases were received, it was often days after injury, due to lack of cooperation in the transportation of this class of cases. The startling fact was that when admitted to this hospital the fractured jaw cases had been given no previous treatment. Cases of fracture of other parts of the body arrived in this same base area with splints applied.

The reasons for this were obvious:

1. No men properly trained in the treatment of fractured jaws were assigned to Casualty Clearing Stations.

2. While the principle of the treatment of fractured jaws differs in no way from that of other parts, viz. early reduction and fixation of the bony parts, the application is not so simple. There is no standard splint that can be applied.

With this experience as a basis, as well as what we learned from the Paris base hospitals later, especially the American Ambulance at Neuilly, we determined to bend our efforts to earlier treatment of fractured jaws than had hitherto been attempted.

During the months of June and July, 1918, Evacuation Hospital No. 8, was stationed at Juilly, not far from Paris, and we had occasion to visit the hospitals in Paris to which many of the wounded of the Belleau Woods affair and the Second Battle of the Marne had been evacuated. We were especially interested in learning what we could of jaw and face surgery. We were much impressed by the big, gaping and infected face wounds, associated with fracture of the upper or lower jaw. The junior author had spent nine months with Major Kazanjian in General Hospital No. 20—a British hospital—and we were very much interested in the entire subject.

It was noticed that these wounds behaved badly, they were heavily infected, there was much sloughing with consequent loss of tissue that could ill be spared, and that great retraction of the wound edges took place. All this required in many cases repeated plastic operations before a good result could be obtained. This made for a long convalescence, with oftimes considerable deformity and consequent disfigurement.

We therefore decided to undertake, if possible, an immediate surgical treatment of these cases in our own service, which was an Evacuation Hospital near the front.

In August we were sent to a new station near Verdun, and were behind the American Armies during the entire offensive that began with the reduction of the San Mihiel salient September 12th and continued until the armistice on November 11th. During this time Evacuation Hospital No. 8, was receiving seriously wounded men, and admitted 6,200 wounded, among whom there were 43 with fractured jaws. In practically all of these the fracture was associated with injury of the adjacent soft part, sometimes a small wound, but often a large and extensive one. One of the first things to impress us was that no matter how extensive the wound in the soft parts or how wide the separation, there was rarely any considerable loss of substance, but the defect was caused chiefly by retraction of the wound edges. Most of these men reached us within 18 hours of the receipt of injury and many of them much earlier. In all cases of suspected fracture of the upper or lower jaw the junior author was called at once in consultation. If the jaw was fractured and there was accompanying injury of the adjacent soft parts, some form of splinting was applied and the soft parts were immediately repaired. These two proceedings will be taken up separately, to which will be added a report of the cases and some conclusions therefrom.

We regret very much the lack of photographs, but the machinery of an evacuation hospital during an offensive will not tolerate delay. Its efficiency depends upon many things, of which speed is not the least important.

Between October 1st and November 11, 1918, forty-three cases of fractured jaws were admitted to Evacuation Hospital 8, A. E. F. Of these, thirty-seven were of the mandible, one of the maxilla, and five involving both the mandible and maxilla.

Fixation.—When time permitted permanent splints were made, and twelve cases were evacuated to base hospitals with apparatus of a permanent character in place.

As soon as patients had been admitted, they were immediately radiographed. At first only flat plates were available, but Capt. Alleman later was able to secure a stereoscope, which gave more definite information. In the operating room the wounds were thoroughly examined and the method of treatment was decided upon. In all cases dependent drainage was provided if not already established, and foreign bodies were removed.

The method of fixation used depended upon circumstances existing in the hospital, and the problems presented by the cases themselves. It is impossible to lay down rules for the reduction and fixation of fractured jaws. Each case must be considered individually. As stated, in twelve cases permanent splints were adjusted. These were metal band and wire splints, and vulcanite splints.

In eleven cases the injuries were at the angle of the mandible, and the lower jaw was wired to the upper jaw with the teeth in occlusion.

In several cases, especially where the tongue was swollen, temporary open bite splints were applied.

In fractures of the maxilla, Kingsley splints with extensions, extra-buccally, connected with head-gear, were used.

In cases of extensive wounds of soft parts, immediate reduction and temporary fixation of bony parts were secured. Heavy arch wire of german silver and brass orthodontia wire were used. Often when these were partly in place, the final adjustment was left until the post-operative period of nausea had passed, when they were tightened up. After fixation the plastic operation of soft parts was performed. As soon as the sutures could be removed, the temporary apparatus was replaced by one of a more permanent character, or the patient was evacuated to a base hospital where it could be done.

The splints used were those which could be easily and quickly made, and in fact all the work was made as simple as possible.

It is not feasible to keep cases of fractured jaws in an evacuation hospital for more than a few days, chiefly on account of the difficulties of providing suitable diet, as well as the routine care.

Two factors that helped greatly in this early treatment were, the changed character of the warfare, more open fighting and consequently fewer injuries with great loss of tissue, and the fact that the American soldiers had much better teeth than the British soldiers. Too much emphasis cannot be put on this latter fact, for our best guide is the occlusion of the teeth. Splints and wires are attached to the teeth, and when these are missing it complicates matters considerably.

Repair of Soft Parts.—There are four great enemies to be overcome in war surgery—shock, hemorrhage, infection by anaerobes, and infection by the streptococcus pyogenes. In maxillo-facial injuries uncomplicated by other wounds, both shock and serious hemorrhage are unusual. There was not a single case of gas infection clinically in our service, in any injury above the clavicle. Most of them showed anaerobes in cultures taken from the wound before operation. Infection by pyogenic organisms and especially the streptococcus was almost entirely controlled by dependent drainage. This is a most important matter and should always be instituted. In our series there was not a single instance of infection requiring secondary operation and no case of secondary hemorrhage.

After application of the temporary splint the patient was anesthetized with ether through a tube in the nares. A careful study of the soft parts was made and a plan of procedure mapped out. This was important in extensive injury.

The preparation consisted in shaving the skin, cleaning with benzine, ether and the application of iodine. The skin edges were carefully debrided with straight sharp scissors, care being taken not to sacrifice any particle however small. The entire depth of the wound was then debrided, care being taken to follow all ramifications. Curved Mayo scissors were found best for this. All bleeding points were carefully ligated with fine catgut. The mucous membrane surface was usually closed with chromic catgut, leaving the knots in the wound. The muscle was loosely sutured with plain catgut. The skin was closed with silver wire interrupted retention sutures, and the skin edges approximated with interrupted fine silk suture.

A most important matter is the removal of tension from the wound edges. On the successful accomplishment of this depends in very large measure the success of the procedure. This was done with the use of the Tiffany harelip buttons.

Cases of Jaw Fracture at Evacuation Hospital No. 8.

September-November, 1918.

[Army Abbreviations: G. S. W.—"gunshot wound" by any missile, including shell fragment. F. C.—compound fracture. F. C. C.—compound, comminuted fracture. M. G.—machine gun. F. B.—foreign body.]

1. October 17, 1918. Lt. Hanson, Capt. Foote, Lt. Dillon. Admitted September 27. G.S.W. face; F.C.C. of mandible with considerable loss of tissue, loss of teeth on right side from median line to second molar. Lacerated wound of lower lip. Contracted erysipelas. Remaining teeth wired in as good occlusion as possible. Patient ordered to be evacuated to special head hospital at Vichy by Major Schaefer.

2. October 16, 1918. Maj. Shipley, Lt. Dillon. Admitted October 15. G.S.W. right leg and face. M.G. bullet. F.C.C. of mandible right side; very little loss of tissue; fairly large wound on right cheek. Jaws wired together with teeth in good occlusion. Drainage by tube at entrance wound on left side of face.

3. October 11, 1918. Lt. Hanson, Lt. Cronan, Lt. Dillon. Injured October 10, admitted October 11. G.S.W. left side of face; fracture of mandible left side at bicuspid region; very little loss of tissue. Jaws wired together with teeth in occlusion.

4. October 24, 1918. Maj. Shipley, Lt. Reier. Injured October 24, 8 A. M. Admitted October 24, 4 P. M. G.S.W. left side of face perforating mouth; loss of teeth and tissue; F.C.C. of mandible from left cuspid to third molar. Remaining teeth wired together in occlusion for evacuation.

5. October 29, 1918. Maj. Shipley, Lt. Dillon. Injured October 23, 6 A. M. Admitted October 23, 2 P. M. G.S.W. Multiple fracture of lower jaw; line of fracture between left lateral and cuspid, also between right cuspid and first bicuspid. Middle fragment wired to temporary splint and attached to two posterior fragments. This middle fragment was pushed lingually and lay under the tongue. It was brought forward and wired to the other teeth approximating it, and the teeth of the posterior fragments wired to those of the upper jaw for firmer occlusion.

6. October 26, 1918. Capt. Webb, Lt. Dillon. Injured October 24, 1 P. M. Admitted October 25, 2 P. M. G.S.W. neck, lower jaw, upper jaw and nose, perforating. F.C.C. of mandible posterior to lower last teeth left side, and F.C. of upper maxilla left side. Jaws wired together with teeth in occlusion. Tight bandage to be applied on account of this upper fracture.

7. October 9, 1918. Lt. Dillon. Admitted October 9. G.S.W. right side of face; inferior maxilla fractured. G.S.W. lower right side of face; mandible fractured in bicuspid region. Teeth wired together in occlusion.

8. October 14, 1918. Maj. Shipley, Lt. Dillon. G.S.W. lower jaw and neck. Fracture of mandible at symphysis; laceration of floor of mouth, grazing tongue; ragged hole of exit at side of neck; entrance through chin. Band and wire splint wires lingually and labially and bands on the four lower

bicuspids. Eight splints cemented in place. Barton bandage.

9. October 20, 1918. Lt. Dillon. Injured October 12, 11 A. M. Admitted October 12, 11 P. M. G.S.W. face and lower jaw; extensive laceration of the chin; entire mental process separated from mandible; attached large skin flaps involving entire thickness of the skin and upper part of neck. F. C. at region of second bicuspid and F.C.C. from bicuspid region with extensive loss of tissue and teeth around to right inclusive of right cuspid. F.C. at left angle. Jaws wired together with teeth in occlusion.

10. October 13, 1918. Maj. Hennington. Admitted October 9. G.S.W. face and shoulder; F.C. mandible, right cuspid region. Loss of teeth but very little loss of bone. Band and wire splint bands on lower right first bicuspid and first molar and on lower left two bicuspids and second molar and cemented in position.

11. October 15, 1918. Lt. Dillon. Injured October 1. Admitted October 4. Evacuated October 15. G.S.W. face; F. C. C. lower jaw; loss of teeth on left side up to median line; comminution and loss of bone and of lip tissue. Lower jaw temporarily wired to upper for evacuation to special head hospital as ordered by Major Schaefer.

12. October 31, 1918. Lt. Dillon. G.S.W., F.C.C. at left bicuspid region. Temporary open bite splint applied.

13. October 13, 1918. Lt. Dillon. G.S.W. neck and both shoulders; F.C. lower jaw, with considerable loss of bone and teeth in anterior region. Temporary open bite splint applied.

14. October 16, 1918. Lt. Hanson, Lt. Dillon. Injured October 3. Admitted October 4. G.S.W., F.C.C. mandible, anterior region. Laceration of lower lip. Held for observation on account of suspected fracture at base of skull. Cerebro-spinal fluid apparently running from right ear. F.B. in left arm. F.B. in left side of chest wall. F.B. in left thigh. Facial paralysis on right side. Remaining teeth of lower jaw wired to teeth of upper jaw temporarily for evacuation.

15. October 9, 1918. Lt. Dillon. Injured September 29, 10 A. M. Admitted September 29. G.S.W. chin; fracture mandible between lateral and central incissors. Band and wire splints cemented in place October 3 from left bicuspids to right bicuspids.

16. October 17, 1918. Lt. Dillon. Admitted October 11. G.S.W. face, perforating from right cheek to left neck; F. C. C. lower jaw. Fractures at median line and between second bicuspid and first molar on right side. Temporary open bite splint applied.

17. October 16, 1918. Maj. Shipley, Lt. Dillon. Injured October 14. Admitted October 15. G.S.W., F.C.C. mandible right bicuspid region; tongue badly lacerated and swollen. Temporary open bite splint applied.

18. October 11, 1918. Lt. Hanson, Lt. Dillon, G.S.W. right side of face; fracture mandible, right side posterior to last tooth. Jaws wired together with teeth in occlusion.

19. October 8, 1918. Lt. Dillon. G.S.W. right side of face and neck; fracture at right angle of jaw but not confirmed by x-ray. Teeth immediately wired in occlusion. G.S.W. right side of face and neck perforating one end at angle of jaw, other at angle of mouth. Enormous swelling of face and neck; mouth and tongue covered with sordes. Consultation decided anesthetic inadvisable. (Maj. Weeks.)

20. October 10, 1918. Lt. Dillon. G.S.W. fracture mandible, left side, posterior to last tooth. Right displacement downward of mandible, left side. Jaws wired together with teeth in occlusion.

21. October 11, 1918. Lt. Dillon. G.S.W. left parotid region, entrance; exit right; fracture of mandible, left side posterior to last tooth. Jaws wired together with teeth in occlusion.

22. October 26, 1918. Maj. Hennington, Lt. Dillon. Injured October 24. Admitted October 24. G.S.W., F.C.C. mandible at right angle. Teeth wired together in occlusion.

23. October 27, 1918. Lt. Col. Evans, Lt. Dillon. Admitted October 25. G.S.W., F.C. mandible, left angle; multiple F.C. superior maxilla. Great loss of spongy tissue and teeth of superior maxilla. Remaining fragments have very little attachment. Closed bite temporary splint holding fragments in probable alignment with lower teeth. Open above to allow for drainage. Tight Barton bandage applied with force directed toward right side to offset displacement of mandible.

24. October 29, 1918. Maj. Brickner, Lt. Dillon. Injured Otcober 23, 10:30 A. M. Admitted October 24, 10:30 A. M. G.S.W., F.C.C. mandible. Line of fracture at right side posterior to existing teeth. Jaws wired together with teeth in occlusion.

25. October 13, 1918. Lt. Dillon. Injured October 12, 8 A. M. Admitted October 12, 2 P. M. G.S.W. perforating left jaw, left shoulder; F.C.C. at left angle of jaw; F.C.C. left scapula. Bullet ranged downward. F.C.C. of jaw with injury to facial muscles. Gauze drainage. Jaws wired together with teeth in occlusion. Gauze drainage because of orders regarding dependent drainage in jaw fractures.

26. November 1, 1918. Maj. Shipley, Lt. Dillon. G.S.W., F.C.C. mandible, extending from left cuspid to right second molar with loss of teeth and bone between and extensive loss of soft tissue. Temporary band and wire splint on lower jaw, and lower jaw wired to upper with parts in fairly good position. At time of evacuation wound and mouth clean.

27. November 8, 1918. Maj. Shipley, Lt. Dillon. Injured October 5, 11 A. M. Admitted October 6, 1 P. M. G.S.W. lower jaw; F.C.C. mandible between left central and lateral; comminution at symphysis; some loss of bone; mental process fractured off, comminuted. Small fragments of bone removed. Large fragment left, soft parts debrided, closed with drainage. Band and wire splint; bands on lower four bicuspids and wire labially. Inferior fragments right side fractured longitudinally; silver wire passed around the fragments and wired up to the splint.

28. November 11, 1918. Lt. Levin, Lt. Dillon. Admitted November 11, 6 P. M. Duration of injury, 8 hours. G.S.W., F.C.C. upper jaw left side; wound penetrating into antrum. Temporary interdental splint applied before plastic operation. (Lt. Dillon.) G.S.W. of face entering over molar, bone going downward through middle upper lip. F.C.C. superior maxilla; anterior wall of antrum collapsed, comminuted; about two-thirds of upper lip absent. Mucous membrane of mouth torn in shreds. Mucous membrane replaced, making a vestibule on the left side of mouth. Skin edges freshened and sutured with silk, mucous membrane with catgut. Still a large defect in upper lip. Wound painted with iodine. G.S.W. perforating right index finger. Iodine dressing, local anesthetic (novocaine). Chin cup and head gear attachment. Chin cup attached to head gear by elastics on both sides to relieve the pull of muscles downward. Barton bandage.

November 8, 1918. Lt. Dillon. Fracture, accidental, in median line of mandible. Jaws wired together with teeth in occlusion.

30. Lt. Dillon. F.C.C. mandible between right second biscuspid and first molar, also on the left side bicuspid region, with fracture of alveolar process of upper left side of maxilla. Teeth of lower jaw wired to the upper jaw in good occlusion.

31. November 10, 1918. Maj. Bruggeman. Wounded November 10, 11 A. M. G.S.W., F.C.C. mandible, left side. Incision under local anesthetic of left side of jaw to release tension. (Maj. Bruggeman.) Loss of teeth between cuspid and molar region. Temporary open bite splint applied with Barton bandage. Mouth very clean at time of evacuation.

32. Admitted November 10, 1918. Maj. Hennington, Lt. Dillon. G.S.W. just below angle right jaw with large wound of entrance and two foreign bodies in contact with fractured jaw. Removal of two F.B. and cleansing of wound. (No anesthetics.) Lower jaw wired to upper jaw with teeth in occlusion.

33. Maj. Bruggeman, Lt. Dillon. Fracture posterior to existing teeth on right side of mandible. Lower jaw wired to the upper of the remaining teeth in occlusion. Soft tissue sutured with drainage.

34. November 13, 1918. Capt. Chaffee, Lt. Dillon. Injury 7 hours old. G.S.W., multiple, left side of face; F.C.C. mandible left side between first and second molar; one of wounds of face perforating into the buccal cavity. One suture through mucous membrane, closing opening into buccal cavity. Wounds superficially debrided. Much dirt and gravel removed. Gauze drain into each. No teeth lost. Jaws wired together in good occlusion. Barton bandage.

35. October 15, 1918. Maj. Weeks, Lt. Dillon. Injured October 11. Admitted October 12. G.S.W., F.C.C. mandible at symphysis; little loss of tissue. Band and wire splint: band around right lateral cuspid and first bicuspid and left lateral cuspid and wire attached labially and cemented in place.

36. October 16, 1918. Lt. Hanson. G.S.W. face and left shoulder; F.C.C. mandible at symphysis region. Band and wire splint; bands on lower cuspids and wire labially, and cemented.

37. October 31, 1918. Maj. Brickner, Lt. Dillon. Admitted October 17. G.S.W. face, entrance left parotid region, below zygoma; two large shell fragments buried in naso-pharynx, right side; transmitted fracture at left condylar region of mandible, displacement to left side. F.B. removed (Maj. Brickner). Band and wire splints on both jaws and a tube and wire arrangement to prevent displacement to left, with elastic bands between the two splints to allow some movements to prevent ankylosis.

38. October 11, 1918. Lt. Dillon. Injured October 1. Admitted October 1. G.S.W. right side of face; fracture both upper and lower jaws. Fracture of mandible at right angle. Fracture of superior maxilla with loss of tissue on right side from second bicuspid posteriorly, on left side loss of tissue in first molar region. Removable vulcanite inter-dental splint on anterior teeth of both jaws with closed bite on account of fracture of mandible and not extending posteriorly to allow for extensive irrigation necessary. Splint supported from external appliance on head attached to wings extending externally from splint. Additional support to lower jaw by tight bandage. Extensive face wound with loss of soft tissue and very septic on arrival, but comparatively clean at time of evacuation.

39. September 26, 1918. Lt. Dillon. Injured September 26, 1 A. M. Admitted September 26, 3 P. M. G.S.W. face; fracture mandible, at left angle complete; fracture mandible at left second bicuspid region, incomplete. Facial wound closed immediately after admission. Pus draining into mouth October 2, at lower left bicuspid region.

40. October 10, 1918. Lt. Dillon. Injured September 26. Admitted September 26. G.S.W. neck; entrance below angle of jaw, right side; exist left mental region. Loss of teeth from second molar left side to right central. Considerable loss of bone in this area. Enough bone left to form a continuous lower border of the mandible in spite of fracture. Mouth remarkably clean at time of evacuation. Drainage from beneath angle of mandible at right side and mental region left side.

41. October 27, 1918. Maj. Shipley, Lt. Dillon. Admitted October 27. Duration of injury, 14 hours. G.S.W. neck and face, perforating. F.B. located by *x*-ray not found. Fracture both superior maxilla. Extensive laceration, hard and soft palate. Right maxilla largely removed. Soft palate detached and hanging in naso-pharynx, obstructing respiration. Sutured back in position as well as possible. Wound behind angle of left side of lower jaw enlarged and drainage made through this wound. Lower jaw not fractured. Nasal cavities largely destroyed. Packed through mouth (Maj. Shipley). Late re-examination by *x*-ray shows fracture of the mandible at median line, little displacement, also probable fracture at the angle, left side. Fracture of the maxilla, right side, between second bicuspid and first molar. To

bring about reduction of parts to proper relations probably requires gradual methods. Therefore, no apparatus has been made.

42. October 15, 1918. Maj. Brickner, Lt. Dillon. Admitted October 14. G.S.W. chin; F.C.C. mandible at left bicuspid region; F.C. alveolar process extending forward to incisor teeth. Lower jaw wired temporarily to upper jaw with teeth in good occlusion.

43. October 17, 1918. Maj. Shipley, Lt. Dillon. Injured October 10, 9 A. M. Admitted October 10. G.S.W. perforating face, tongue and lower jaw; F.C.C. mandible, bilateral, anterior to angles. Wound through left cheek, tongue and into right cheek. Large éclat removed from right cheek. Jaws wired together with teeth in good occlusion.

Conclusion.—The treatment of maxillo-facial wounds near the front in an Evacuation Hospital permits the earliest possible application of a splint, *i. e.,* early reduction and fixation of bony parts. When this is done, immediate plastic operations on soft parts can be accomplished with no subsequent breaking down. In this way sepsis is greatly reduced; secondary hemorrhage is nearly eliminated; loss of tissue is much lessened; the patients arrive at Base Hospitals in good condition; the period of convalescence is lessened; and there is less disfigurement.

ARTIFICIAL RESTORATIONS AFTER THE SURGICAL REMOVAL OF PORTIONS OF THE MAXILLA OR MANDIBLE.

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New York City.

Deformities of the oral cavity produced by the necessary surgical removal of portions of the maxilla or mandible, are many and of various extent.

While the life of the patient has often been saved by operation, the loss of these tissues produces a condition in which life is of little joy to the patient.

The deformity is often very unsightly, and the speech is so defective as to be almost unintelligible. The function of mastication and deglutition in many cases is so badly impaired as to be almost useless.

In the reconstruction of these conditions, mechanical means are resorted to, as surgery can be of little assistance. The materials used as substitutes for the missing tissues, are gold, hard rubber and porcelain.

The principle involved in reconstruction, is to restore, as nearly as possible, the normal shape and size of the missing tissues, so as to allow normal functioning. The factors to be considered in these restorations are, mastication, speech and appearance, in the order named, as to importance.

The illustrations and description of the treatment of a few cases will probably be the best method of presenting this subject.

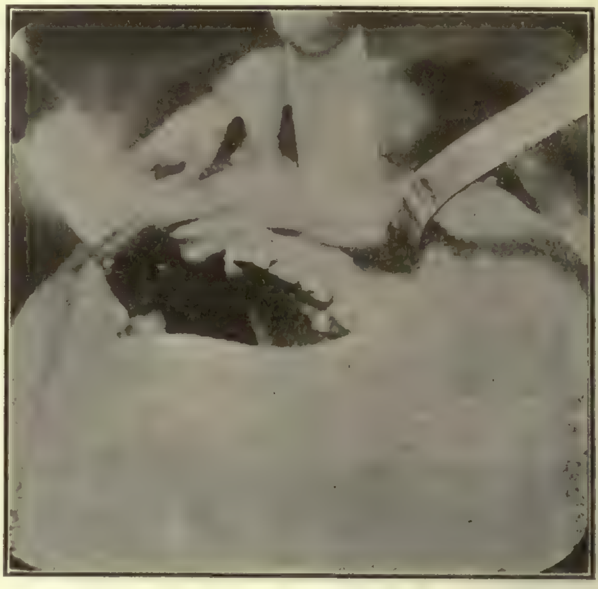

Fig. 1. Case I—Defect after removal of superior maxilla.

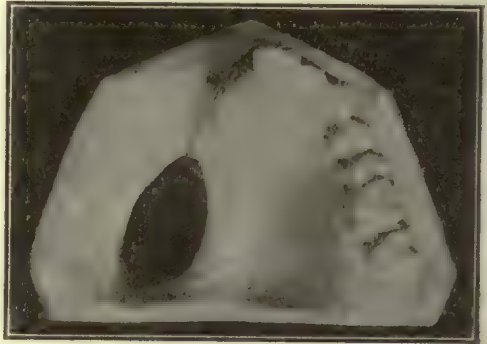

Fig. 2. Case I—Plaster model of defect.

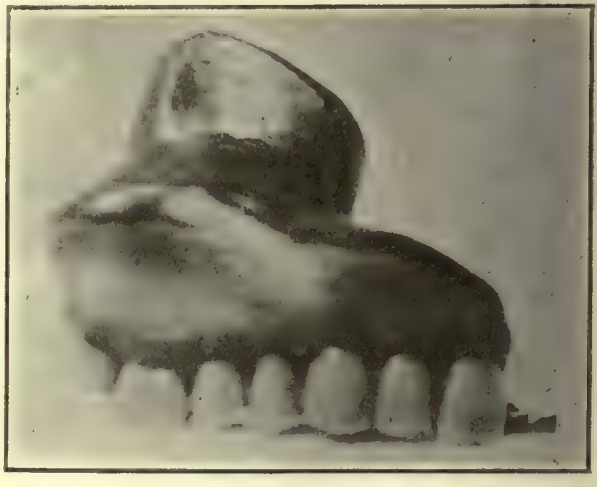

Fig. 3. Case I—Prosthesis of hard rubber, with porcelain teeth.

Case I. Male, age 45. Sarcoma of the right superior maxillary bone. Entire bone removed, from the median line, including all the teeth on that side. (Figure 1.)

Figure 2 is of a plaster model of the upper jaws showing the loss of tissue and the large opening into the nasal passage. Speech was very much affected, and the deformity of the face was very noticeable owing to the drawing in of the cheek on that side.

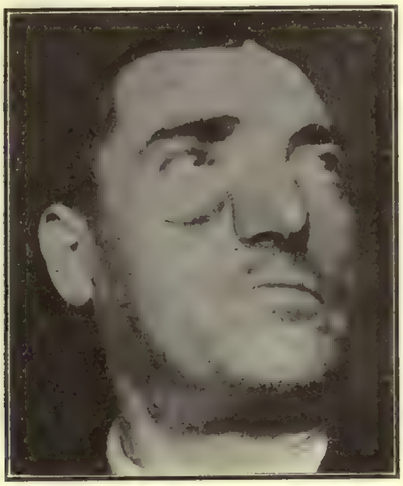
Fig. 4. Case I—Prosthesis in place.

The restoration was made of hard rubber, attached to the remaining teeth by means of gold removable attachments, and all missing teeth were replaced with porcelain ones. (Figure 3.) The great loss of tissue necessarily made the restoration bulky, but as it was hollow its weight was not more than that of an ordinary dental plate. By restoring the roof of the mouth and the floor of the nose, speech was almost immediately restored The cheek was held out to almost its normal outline. (Figure 4).

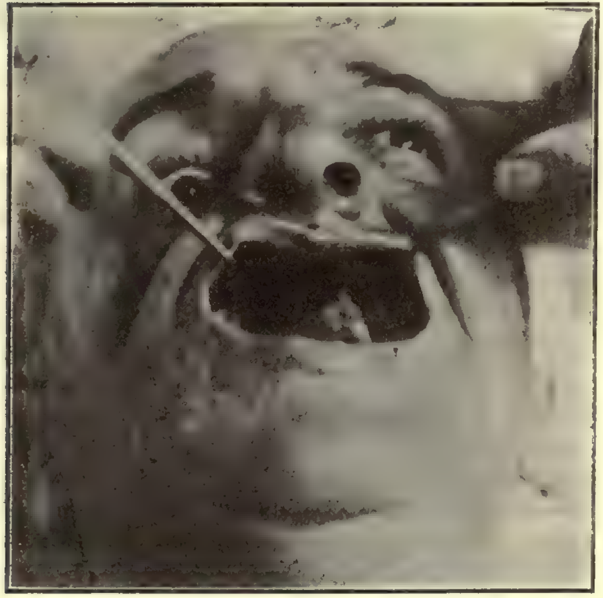
Fig. 5. Case II—Defect after removal of both superior maxillae.

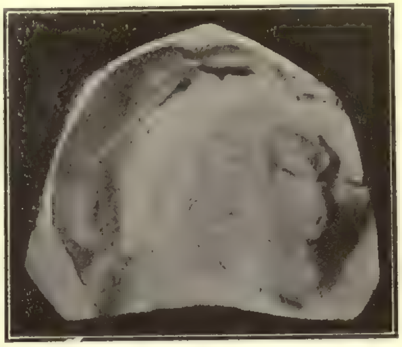
Fig. 6. Case II—Plaster model of upper jaw.

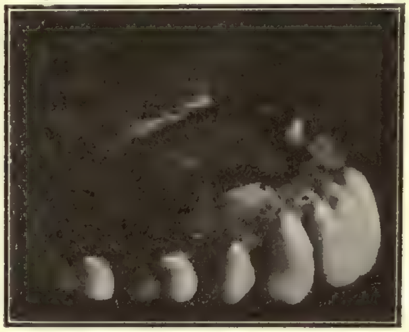
Fig. 7. Case II—Prosthesis

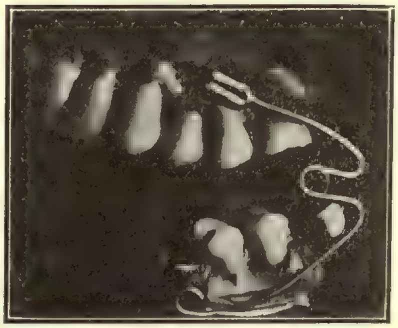
Fig. 8. Case II—Prosthesis with supporting spring

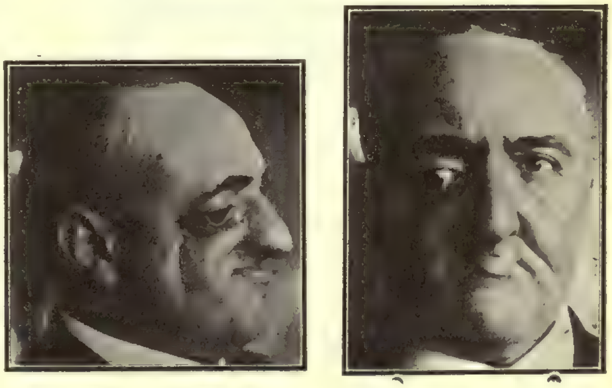
Fig. 9. Case II—Before inserting prosthesis.

CASE II. Male, age 45. Sarcoma of the superior maxillary bones. Right superior maxilla removed and the left, as far back as the second molar tooth. All teeth removed. (Figure 5).

Figure 6 is of a plaster model of the upper jaw. Restoration (figure 7) was made similar to that in Case I.

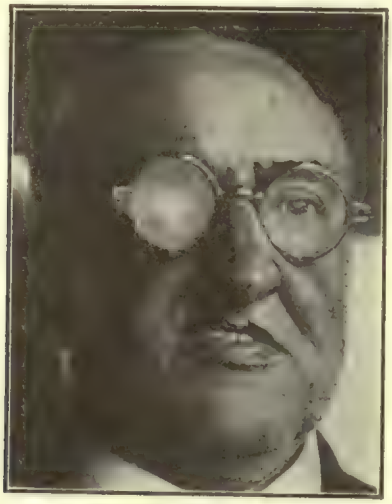

Fig. 10. Case II—Prosthesis inserted.

As there were no teeth to attach to, and no support to be had from the remaining tissues, it was necessary to devise some means to hold up the appliance. This was done by attaching to the prosthesis a spring, the free end of which slid in an open gold sleeve, fastened to a small plate made for the lower jaw to replace the two missing teeth on the left side. (Figure 8). The tension of the spring was sufficient to hold the appliance in position when the mouth was opened.

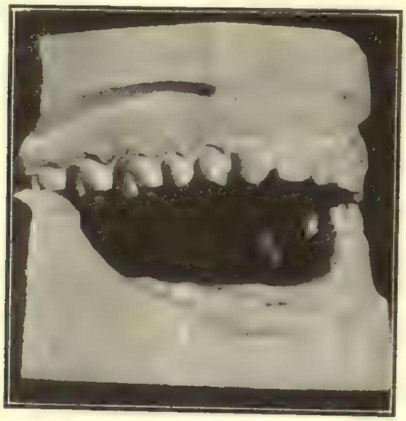

Fig. 11. Case III—Model of defect in mandible.

Figure 9 shows profile and front views of the patient without the appliance and figure 10 a frontal view with the piece in place.

Case III. Male, age 32. Necrosis of the mandible, extending from the first bicuspid on the left side around to the ascending ramus on the right side. Figure 11 is of a plaster model of the mouth, showing the loss of tissue. A regeneration of bone had taken place.

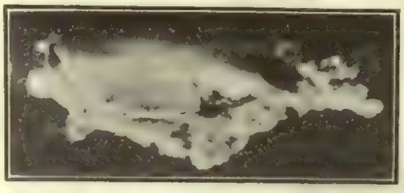

Fig. 12. Case III—Sequestrum removed from mandible.

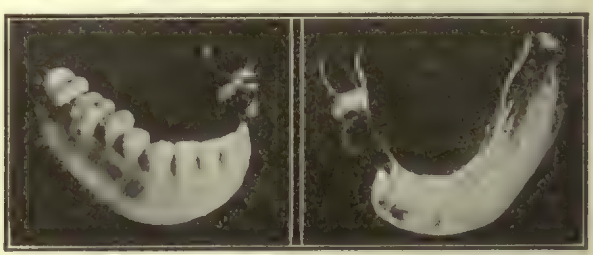

Fig. 13. Case III—Prosthesis.

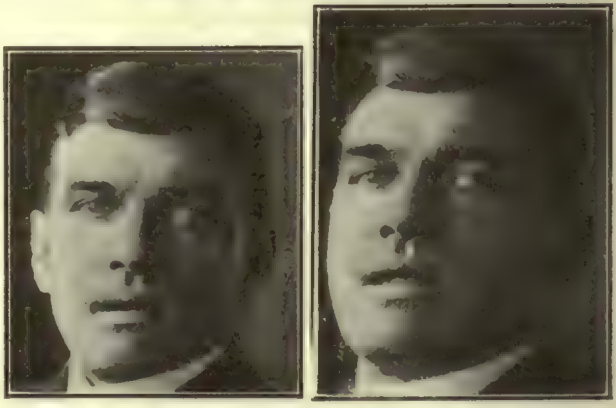

Fig. 14. Case III—Before and after inserting the prosthesis.

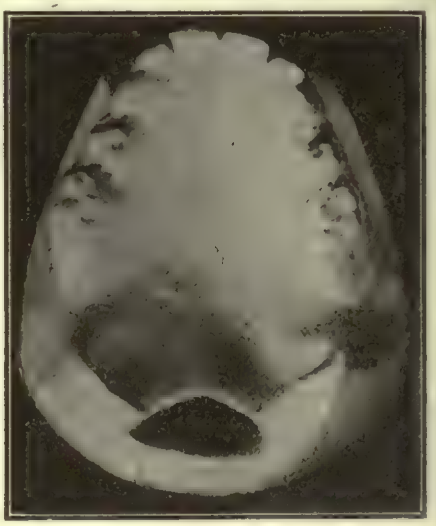

Fig. 15. Case IV—Model showing loss of tissue.

Figure 12 is of the sequestrum that was removed. Figure 13 shows two views of the restoration.

Figure 14 shows the patient without and with the restoration.

Case IV. This is an exceptional case, that of a boy, age twelve, with uvula and a portion of the soft palate accidentally sacrificed in an operation to remove adenoids and tonsils, at eight years of age.

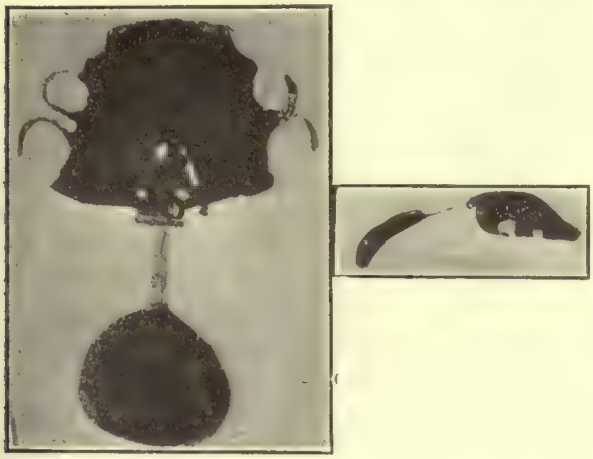

Fig. 16. Case IV—Prosthesis for defect in soft palate.

Figure 15 is of a plaster model showing the lost tissue. Figure 16 shows two views of the appliance constructed for this case.

As speech had not been fully developed at the time of the accident, and as nothing had been done for the child in this direction for four years, the restoration of speech was almost as difficult as in a congenital cleft-palate case.

17 East 38th Street.

EMPYEMA THORACIS.

Frank T. Fort, M.D., F.A.C.S.,
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The recent epidemic of influenza has taught us that empyema, or pyothorax, may sometimes be a primary infection, instances having been observed where no other intrathoracic disease could be demonstrated either clinically or at necropsy. In such cases the route by which the pyogenic bacteria reach the pleural cavity is problematical; it may be from a distant focus of infection through either the blood stream or the lymph channels, or both. It hardly seems reasonable to suppose that virulent germs could migrate from the lung or other adjacent viscera to the pleura and there induce inflammatory reaction with the production of purulent fluid, without causing similar change in the other structures, although this method of pleural infection has been suggested on the basis that "the pleural membranes may be a more suitable soil" than obtains elsewhere.

Ordinarily empyema has been regarded as a complication of other existing disease, and this is true in the majority of cases; thus it may be secondary to any disease involving the intrathoracic viscera; it may follow perforating gunshot or stab wounds of the chest; it may be a sequel to violence externally applied. Pleurisy with effusion from any cause may become empyema by the invasion of pyogenic bacteria. More often than otherwise, however, it is noted as a complication of bronchopneumonia. The most serious cases are those in which the streptococcus hemolyticus is the responsible organism, and this was true in the majority of the pneumonias that followed measles and influenza during the epidemic of 1917 and 1918. In nearly all these cases the hemolytic streptococcus was found during life, not only in the pleuristic fluid but also in the blood stream; and examination of various structures at autopsy revealed the presence of organisms of the same types. This led to the assumption that pneumonia and empyema due to infection by the streptococcus hemolyticus must simply be part of a general bacteremia or septicemia. A rather significant fact was that autopsies upon patients dying from this type of pneumonia with empyema disclosed multiple abscesses in various portions of the body, also encapsulated abscesses in various portions of the lung, which showed hemolytic streptococci. Of course, under such circumstances it would be impossible to determine whether the empyema owed its origin to the pneumonic process, or whether it was secondary to a pre-existing focus of infection located elsewhere in the body.

It is a strange commentary that in the earliest stage of the affection the pleuritic fluid on examination is usually shown to be serous and oftentimes no microörganisms can be demonstrated, but within a few hours or days it becomes distinctly purulent in character due to invasion of pyogenic bacteria. This fact has suggested the idea that pyogenic organisms are always secondary invaders and not primary causative factors in the production of empyema. However, it must not be forgotten that clinically the line of demarcation between simple pleuritic effusion and empyema cannot be clearly and positively defined excepting by frequent thoracentisis and bacteriological examination of the fluid thus withdrawn, and this practice would be unjustifiable in the absence of clinical manifestations demanding such procedures.

A characteristic feature in the majority of empyema cases observed in military practice during the epidemic of pneumonia following influenza and measles was that the accumulation of fluid was exceedingly rapid. Sometimes during the interval between examinations (three to six hours) there would be noted a decided change in the clinical picture owing to the rapidity with which the fluid increased in quantity and purulence. Bacteriological examination of the fluid withdrawn at various times disclosed the presence of different types of bacteria, the order of their frequency being: (a) pneumococcus, (b) streptococcus and streptococcus hemolyticus, (c) micrococcus catarrhalis, (d) staphylococcus, and (e) tubercle bacillus.

It will be thus noted that the predominating organisms were the pneumococcus and the streptococcus hemolyticus, the latter being the most virulent of the streptococcus group, which probably accounted for the severity of the infection and the tremendous mortality in the early part of the epidemic. The other organisms seemed to play less important rôles in the production and virulence of the infection. In many instances the disease assumed an unusual severity from the beginning and pursued a rapid course, death occurring from an overwhelming toxemia within twenty-four hours after empyema developed.

The early clinical diagnosis of empyema is not always easy of accomplishment. In many of the rapidly fatal cases seen during the epidemic accurate ante-mortem diagnosis was impossible, the presence of purulent fluid in the pleural cavity being discovered only at autopsy. The fatalities in these cases occurred not from the empyema, *per se*, but from general bacteremia, autopsy in nearly every instance showing hemolytic streptococci in the blood and also in multiple abscess formations in remote portions of the body. Where the infection was less virulent and not so rapidly fatal, indicative clinical signs of empyema were usually noted, such as evidences of toxemia or the so-called "toxic shock," continued high temperature (102° to 104° F.), with chest pain, dyspnea and slight bulging of the affected side from pressure of the accumulated fluid; and if subjected to examination by means of the *x*-ray, as all these cases should be, the roentgenologist should be able to differentiate between empyema and pneumonia. The severity of the clinical manifestations, however, was not always in consonance with the virulence of the infection. In many of the early fatalities the patients exhibited slight symptoms until a few hours before death, when toxemia became pronounced as evidenced by profound shock, prostration, cyanosis and collapse.

Many early diagnostic clinical signs to be obtained by palpation, percussion and auscultation, have been mentioned by various writers, but for the most part they are unimportant in actual application, e. g., displaced cardiac impulse, tubular (rasping) breathing, dullness or flatness associated with abnormal breath sounds, asymmetric chest excursions, etc., etc. Roentgenological examination has proven of value in differential diagnosis between consolidation and pleural exudate; but thoracentesis and bacteriological examination of the fluid is necessary to determine the type of the infective organisms present. Blood pressure determinations are of little or no consequence. The leucocyte count, however, is always indicative as in all other suppurative processes. Exploratory thoracentesis still remains the only method by which the diagnosis can be certainly perfected and the stage of the disease determined. Several punctures may have to be made before pus is located, especially where the procedure has been delayed for a considerable time, as pleural adhesions are prone to occur thus creating pockets in which the fluid accumulates. "These pockets may occur in any portion of the pleural space, between the lung and the chest wall, or between the lobes." They may be single or multiple, in the latter case adding greatly to the difficulties of diagnosis and treatment.

The treatment of empyema is never medical but distinctly and essentially surgical so soon as the diagnosis has been perfected; and it is unfortunate that the surgical management of this affection seems impossible of even approximate standardization. In the army camps, as in civil practice, various methods were employed early in the epidemic, ranging from simple (repeated) thoracentesis to the radical procedure of costatectomy, with little variation in either morbidity or mortality. It was the custom of those in charge of certain base hospitals to practice early costatectomy, under the impression that radical measures were indicated so soon as pus had formed; thoracentesis frequently repeated was the sole procedure in other institutions; stab wounds and intermittent aspiration by means of catheters introduced through such wounds was also tried; drainage by Brewer's tubes was practiced, negative pressure being secured by siphon bottles; thoracotomy and irrigation with Dakin's solution was another procedure followed; also tried was the method devised by Mozingo and modified by Sherrill, which briefly consists of the introduction of a trocar through which a rubber tube is inserted into the pleural cavity and the fluid withdrawn by means of suction with a small bulb syringe; the cavity is then irrigated every two hours with Dakin's solution, or until the exudate is dissolved as shown by the returned fluid; then the introduction of from 20 to 60 c.c. of two per cent. formalin in glycerine every two or three days after removal of the fluid until bacteriological examination is negative; the tube is then removed and the small opening covered with sterile gauze. A criticism of this method of treatment is that the tube is so small that it is impossible to keep the lumen open.

After the pneumonic process has become sufficiently clear and the type of bacteria has been determined, costatectomy having been decided upon, I believe the best method of procedure is to resect three-fourths of an inch of the rib (preferably the seventh in the post-axillary line) with rapid insertion of a rubber tube thirty inches long and one-half inch in diameter which is fastened into the cavity; sufficient pus is allowed to flow through the tube to insure its patency and a clamp then applied to prevent all the pus escaping during the operation; the patient is returned to bed with the clamp still on the tube, after which the clamp is removed and in the course of three or four hours the remainder of the pus is allowed to escape. The end of the tube is placed in a wide-mouth bottle half filled with normal saline of boric acid solution and the cavity is allowed to thoroughly drain. After twenty-four hours Dakin's solution or one-half of one per cent. chlorazine is introduced into the chest until the cavity is about three-fourths full, then a clamp is placed on the tube and the fluid held within the chest for fifteen mniutes after which the clamp is released and the cavity is allowed to empty itself. This procedure is repeated every two hours; a daily bacterial count is made from the last material draining from the cavity just before the Dakin's solution is introduced, this count being made at the same hour each day; when the bacterial count has diminished to only a few per field the tube may be detached from the chest wall and the cavity rapidly heals. The average time the tube remains in the chest is from seven to ten days. If these cavities are allowed to close too quickly, there will be a reformation of pus in the most dependent portion of the cavity and the surgeon will be forced, as I had to do on two or three occasions, to insert forceps through the resection opening and thus allow the accumulated pus to escape. These secondary pus formations are usually not very virulent in character and the wound quickly closes after having been kept open for a variable length of time.

The mortality in empyema cases during the height of the epidemic under the most approved methods of treatment was between forty and fifty per cent. This high percentage of mortality was not in my opinion due to the manner of treatment, but rather to a lack of perfect understanding of the nature of the disease. I believe, however, in the beginning of the epidemic some of the patients were operated upon too early, before the pneumonic process had sufficiently resolved to make the operation safe. Perhaps many of these patients would have died sooner than they did had they not been operated upon. In other words, some of these patients were doomed from the beginning because of the virulence of the infection, and they would have died just the same regardless of the method of treatment.

CONCLUSIONS.

(1) In the surgical treatment of empyema the best results are secured under local anesthesia, one-half of one per cent. procaine (novocaine) or one of the other preparations. The operation can be completed much more rapidly and with less pain to the patient, the average time being about ten minutes.

(2) In the case of delirious patients or those hyper-nervous, it was only necessary to administer a light general anesthetic (ether). It rarely required over 90 c.c., as little as 40 c.c. having been used.

(3) Observation has shown that a certain percentage of cases of empyema could be successfully treated by the injection of two per cent. formalin in glycerine, twenty-four hours old, from 10 to 40 c.c. being used every third day. This procedure was most successful in the type of fluid which contained only pneumococci.

(4) The operative results were better in those cases where the empyemic process had existed in the chest for several days, than where operation was performed earlier.

(5) The use of a medium or large moderately soft rubber tube thirty inches long and one-half inch in diameter fastened securely into the chest wound seemed to secure the best results so far as drainage was concerned, preventing soiling of the bed and lessening the bacteria in contact with the wound surface; this plan also entirely obviates the odor usually associated with the drainage in cases of empyema treated by other methods.

(6) Dakin's solution freshly made 49/100 of one per cent. may be used for flushing the chest every two hours after the first twenty-four hours, the fluid being held within the cavity by clamping

the tube for fifteen minutes each time. This plan has given fairly good results. Where Dakin's solution cannot be obtained one-half per cent. chlorazine solution used in the same manner gives practically the same results.

(7) The two one-gallon bottles with tube attachment and mouthpiece for each patient, one partly filled with water and the water blown by the patient from one bottle to the other, seems to be of great assistance in the more rapid inflation of the collapsed lung.

(8) The use of Dakin's or chlorazene solution as described, in my opinion helps to prevent the formation of pus-pockets within the cavity during convalescence.

(9) At the time of the operation, if the cavity contains a large amount of pus, it is advisable to prevent evacuation of the entire quantity at the time by plugging the wound, introducing a drainage tube with forceps attached and allowing gradual escape of the pus by loosening the forceps occasionally after the patient has been returned to bed.

TREATMENT OF TRAUMATIC SHOCK.*

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In view of all that has been recently contributed to the treatment of traumatic shock, it becomes a vital question in the everyday work of the surgeon how much he must modify his usual methods in order to do for his patient all that will be demanded of him.

So very much literature has been introduced by men capable of making correct observation and drawing proper deductions from a large amount of material in the last few years, that it may well appear to the man who is somewhat removed from the world activities that the last word has properly been said upon shock.

But this is probably not true, nor can it be true of any condition that occupies, as this does, the borderline of life and death.

"Life is Act and not to Do is Death."

W. T. Porter from Harvard, and representing the Rockefeller Institute, in 1916 made extensive observations on shock in France. He has written a most readable little book entitled "Shock at the Front." When one also considers the very valuable material on shock from Cannon, Cowell, Fraser and Hooper of the British Medical Research Committee, together with a host of other comment and experiments, it becomes plain that one must exercise the best judgment he has if he attempts to discriminate.

Porter is a physiologist. He should be welcomed most cordially to our midst as a co-worker, for physiology is too often laid on a shelf as soon as the medical degree has been conferred. We can not all have his respiratory box, even if we desire it, and a tank of compressed carbon dioxide at hand, but we can if we choose, as Dr. Porter suggests, direct the patient, if sufficiently conscious, to breathe deeply. We can perform artificial respiration; we can assist the diaphragm in dragging from the abdomen the blood hypothetically collected there back to the heart by making interrupted pressure coincident with inspiration. In doing even this, we emulate, in a minor way to be sure, the example and teaching of a physiologist who devoted much time and energy to the betterment of surgery.

It calls for considerable material to carry out Porter's suggestions properly. In the first place, there must be a box and this attached to the face, or the neck of the patient, so that carbon dioxid gas can be let into the box and the gas breathed in a regulated amount. There are two holes in opposite sides of the box, one for the entrance of gas and the other for the entrance of air. There must also be a tank of compressed carbon dioxid to draw from in order to make the arrangement complete and these must have suitable tubular connections. The idea is that the splanchnic vessels are overfilled and that here is a reservoir into which the patient is bleeding. The box attachment is made to the head of the patient, carbon dioxid is supplied, and a sort of air hunger is produced which causes the patient to drag this load of blood by the force of deep excursions of the diaphragm back to the lungs, heart and arteries of the chest.

Cowell, of the French army, says that the best way to produce shock in animals is to expose the intestines and to handle them. The large veins of the mesentery become engorged, and the intestines have the appearance of being inflamed. But this does not occur in traumatic shock. Cowell also states that surgeons of extensive experience in the present war who have operated upon hundreds of patients in all degrees of shock testify that on opening the abdomen they have not found any primary splanchnic congestion. This is, of course, significant and decidedly casts doubt upon Porter's theory and advised practice.

Porter also makes other rather startling statements. For instance, he says shock occurs only in about one in one hundred cases of casualties, and then only when there is a fracture of the femur or injury to superficial fatty parts. In these cases, he observed marked improvement where his box and carbonic gas was used. This may be so, but evidently Porter does not include the kind of shock that "lay" surgeons refer to as secondary shock, nor does he include the state of affairs occasionally observed during gall-bladder operations when the anesthetizer calls out that something is wrong at his end of the line. Porter sticks pretty closely to the idea that casualty shock is due to fat emboli, and offers as evidence that this shock comes on only a few hours after injury and that this observation is verified by the soldiers themselves. To further substantiate his views, Porter goes on to state that the head should be lowered and the abdomen raised so that the blood will be aided in returning to the chest—by force of gravitation, I suppose. Cowell observes that the condition of the injured is not improved by this procedure.

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In point of time of occurrence, the shock described by Porter is simply that which has been observed for a long time and known as the "phenomena of fat embolism."

Shock is such a condition that it defines itself. It announces itself as an alarmingly precarious state of the circulation of the blood; and, as interpreted by some, the heart itself may be perfectly competent. In some way the blood has slipped away from the heart and does not return with its accustomed force and regularity. What would seem a practical question to ask is, where is the lost blood? If there has been a true hemorrhage, then there is an accounting. But where there is reason to believe that no hemorrhage has occurred, what is the explanation of what certainly appears to be a case of the blood of the entire system attempting to get into certain obscure channels and to remain there for an unusual length of time, or until the state which we call shock has passed away.

Now, in typical shock, the blood, and in its usual volume, is still in the body, still in the vessels, but not naturally distributed. The entire amount of blood of the otherwise normal person is still contained in its natural boundaries, *i. e.*, in the heart, arteries, capillaries and veins.

The surface of a person in shock is in the first place horribly blanched. The features are pinched, the lips cold and bloodless, the extremities are equally blanched, and the hands and fingers seem to be withered. There is a condition closely resembling the approach of death. In fact, it does often terminate in death. It is death struggling for mastery. The blood that has eluded the heart certainly is not in the capillaries superficially placed. This much is self-evident.

Now, how are we, as practical surgeons, to interpret this death scene? Of what use is it to argue that the blood is in a state of stasis in either the arteries, veins or capillaries alone, when in all reasonable probability, neither is or can be true? It seems to me, as only a lay surgeon, that we must look upon shock, as in truth it actually is, as a state near death or approaching death. Can anyone conceive of failure of the circulation wherein either the arteries, the veins, or the capillaries alone are affected? And knowing the vasomotor system as we all do, how can we escape the conviction that the heart equally in proportion to its importance as a circulatory organ is affected? The heart is still the emphatic and positive organ of the circulatory system. Now, looking at this matter in the light in which it occurs to me, with these facts plainly before one, with not many unproven theories to try to establish; and realizing the great importance of the heart as a circulatory organ, how can one escape the conviction that the heart in common with the vessels has most thoroughly participated in the blow that has prostrated the entire system of blood circulation?

Further, what obtains if we carry this state of approaching death to its termination in death? Men who have conducted autopsies ought to be able to answer this question, and I know they can do so. Let me ask, isn't the escaped blood always found engorging the large venous reservoirs of the chest? Certainly it is, or I have not seen aright. And why is it there? Simply because the heart, suffering under the staggering blow that shocked the entire vasomotor system had collapsed and could not carry on its work.

Autopsies on individuals who have been clubbed to death over the head abundantly prove this. These people die in a state of shock because the injury was so severe that the vaso-constrictors could not come to the rescue. In other words, the impulse to vaso-dilate, to prostrate, was powerful enough to overcome the impulse to vaso-constrict.

Isn't this about what one fairly well acquainted with the anatomy and physiology of the circulatory systems would anticipate? In shock the heart has been looked upon as a competent organ, and only passively failing in function, whereas the truth of the matter must be that it is in a state of absolute collapse and is unable to perform its accustomed functions. The returning blood is in the chest, just where it would be supposed to be if the heart were for any cause disabled.

It will not be attempted to suggest that the heart collapse, or heart failure, is the sole cause of a perverted circulation, but I venture the assertion, (the heart being the emphatic organ of circulation upon whose functioning depends very much more than upon any other organ the normal continuation of the blood current), that the heart itself is the principal offending agency in the production of shock.

All natural processes are reasonable processes. Theories whose reasoning does not coincide with supposed natural laws usually have to suffer an early revision. I am not a laboratory man; far from it. Presumably that is true of much of my audience. To me, an individual in a normal state is dependent upon the continuous circulation of the fluid known as blood through a series of tubes the principal propelling organ being the heart. If by accident any of these tubes become severed and bleeding from the open ends is allowed to go on, a time comes when life is not only endangered, but that which we call life ceases entirely—the individual bleeds to death.

On the other hand, if no internal or external hemorrhage occurs and an injury is sustained that is so severe that the vasomotor system is placed in jeopardy and the whole circulatory system is, as we say in common parlance, out of commission, then that individual dies of shock of injury in some way transmitted to the heart as a principal agency and to all the bloodvessels as a lesser agency through the vasomotor nervous system.

Like all things else, this kind of reasoning must come to an end, but I want to refer again to the position of this excess blood at the autopsy. From the time of the injury until death ensued the individual was preparing, physically I mean, for death. Presumably the physical condition, so far as congested blood areas and prostrated heart action in two individuals suffering similar injury is nearly identical. But one dies and the other does not. The one that survived had a more or less gradual return of heart power and the other had a more or less gradual loss of heart power until death ensued. During the last few moments that this individual lived there could not have occurred any very marked change in the distribution of blood that had been welling up anywhere, so that at autopsy we would expect to find this blood at about the same locality where it was shortly before death; and there would not have been much difference between the over-full reservoirs of the one that lived and of the one that died at the particular time when both were living and just before the demise of one.

I confess I can see this in no other light and here and on these premises must I base my treatment. To my mind there is no question as to where this lost volume of blood will be found in the individual that dies. My word for it, you will find it in the large vessels of the chest, and in a very appropriate place, too. Shock is so near the substitute of death, why should we not be allowed to compare the two? Isn't the physical condition, so far as the lack of blood circulation is concerned, and the organs of circulation at an autopsy following death from shock very near what must be expected of that individual just before death?

The medical profession is rapidly coming to a very critical attitude. All things must be proven; and that is right. It may be said I cannot prove the entire premises in this assumption. The chest is, especially the center of the chest, rarely opened in life. Perhaps this of itself is suffiicent reason why the lost blood has not been located in the chest before now. With this I am willing to forego further discussion of this particular section.

Some one has offered the definition of Shock as "A sudden or instantaneous depression of organic, nervous, or vital power, often with more or less perturbation of body and mind, passing into reaction, or fatal sinking."

It seems to me that in considering the treatment of shock we might do well to keep in mind this old definition of shock, and of course I would distinctly keep in mind the premises heretofore outlined. I would not naturally recommend the use of carbonic oxid for respiration. I would prefer the free use of oxygen in its natural dilution. I would slightly raise the upper part of the body, because that is the easiest position for the heart belabored from most any cause. I would make the patient comfortable if I could by change of position, by surgical procedure, by medication, by supplied warmth, or by all these combined. Many of these details are carried out more easily than one can relate them. This is no time for fussing. Time is precious. The right thing done on time may mean life for the injured. Pain, fright, dread, are capable of producing, and once produced, of continuing shock. Handle the patient with the greatest care. Make him literally comfortable. Appeal to his courage and allay all mental perturbation possible. I know these seem so trivial that to some it may appear not worth the while. Perhaps not, but these little side details can be introduced while we are performing more important duties.

Cannon, basing his conclusions on data furnished by Cowell, Fraser and Harper, in Report No. 2 of the Special Investigation Committee, Medical Research Committee in Great Britain, has written an interesting and practical paper upon the management of shock. He recites the history of cases with a diastolic pressure much lower than the critical level of Porter, as low even as 40 mm. with smooth recoveries. Porter calls 60 mm. the critical level.

In these cases cited by Cannon, usually a pint of bicarbonate of soda solution was given intravenously. In his recorded cases a hypertonic solution of 4% was given. One and five-tenths per cent. is isotonic with the blood plasma. Moreover, the bicarbonate solution should not be boiled as that process converts the bicarbonate into a carbonate, the blood probably being able to deal with whatever extraneous bacterial material there may be in a fresh unsterilized product.

Cannon in his exceedingly practical way states that "what is wanted is a fluid that will have the advantages already demonstrated from salt solutions—thinning of concentrated blood, lessening of viscosity and increase of blood flow with restoration of arterial pressure—together with antagonism of the state of acidosis."

Milroy is quoted to the effect that from recent experiments hemorrhage results in a loss of reserve alkali in the blood, also that Ringer's, or physiologic sodium chlorid solution, tends at times to aggravate this condition. There is evidence that a rapid state of acidosis is produced in cases operated upon in a state of shock.

After all hemorrhage has been stopped, the alkaline solution may be given. If it is not convenient to give it intravenously, it can be administered by rectum. For all practical purposes, it may as well be given by mouth or rectum, according to Bayliss.

The experiments conducted by Wiggers of Cornell confirm the already prevailing opinion that intestines escaping from the abdominal cavity should be protected by a media that is an imitation of the conditions that naturally surround the intestines, that is, they should be enveloped in gauze wrung out of warm normal saline solution. Wiggers says that abdominal shock is produced in animals by exposing the intestines and causing a current of warm moist air to blow on them; also, that coincident manipulations of the intestines while being exposed to the warm air current prevents shock or renders it less severe. These observations are of rather minor importance, and are not entirely in accord with other observations, but they show that there is no harm in a reasonable amount of handling of the intestines provided they are protected from the influence of the air. The natural sliding of intestines against each other is very similar to manipulation by gloved fingers. Presumably, no intestine has survived after a long exposure to air; no more do fish live out of water.

As to the fear of acidosis, it may perhaps be said that the subject has been too much stressed. It may after all be nature's method of conservation. Slight acidosis does no harm anyway.

It will be only a repetition of human events if in the present case in the treatment of shock some deductions and conclusions have to be dropped by the wayside and those who plod now will be compelled to yet plod on much as before.

Happily the results of many observers corroborate some of the findings of long ago, and this is consoling. Here are some with familiar faces: Stop any hemorrhage, clean immediately the point of entrance of injury if the surface is broken. Use iodine if you choose, but get it clean and apply a temporary sterile dressing. Get the head lower than the body. Get the patient warm and keep him warm. Avoid the possibility of chilling.

In my home town, one or two laymen employed about the traffic offices are instructed to do much of this if time allows before the surgeon appears. These first-aid assistants are also instructed to use the utmost degree of gentleness and care in removing an injured person. They are to straighten an injured limb, but not to reduce a compound fracture, and to apply anything to keep the limb in a normal or a comfortable position. These appliances are always to be outside of the clothing. The patient is then sent to a hospital on our own stretchers. At the hospital the patient is almost always immediately cared for surgically regardless of shock. If there is cerebral compression, shock lasts practically as long as life and compression together exist, and this calls for immediate attention and operation. If there is external hemorrhage, this must be attended to. If some hemorrhage has already occurred, a saline solution is administered intravenously and operation is done under ether. If a limb is so far injured that conservation is entirely out of the question, amputation is done. If fractures occur, they are set under ether. If viscera are injured, every possible precaution is employed not to add to the shock already present that from operative manipulation. Intestines are handled with care and not unnecessarily exposed. It is these injuries that produce the shock, and what better treatment of shock than to repair so far as possible the condition upon which the shock depends, and do it at once, too?

If pain exists, a dose of morphine is given hypodermatically, or by mouth. Ether is still a good heart stimulant. Great reliance must be placed upon the use of blood pressure instruments, before, during and after operation. It takes a short space of time to ascertain the blood pressure and it most certainly should be ascertained.

At the present time, the treatment of shock is passing through a transitional period. We may find out some time we are learning things that "ain't so." In the enthusiasm experienced while progress seemingly is making great strides, it is hard to believe there is "nothing new under the sun." There are new things probably cropping up every day, but the principle of the thing does not change. Remodeling and refinement of old principles is not exactly the making of revolutionary epochs. Billroth performed blood transfusion long ago, not with the precise technique of today, but the principle is the same and unchangeable.

That commodity known as common sense will yet be a serving and useful agency. Good ocular function is a prime requisite before placing anywhere near reliance upon any one agency to do what well applied soap and water can do. Cleanliness is the principle, both microscopic and macroscopic, for the former is very liable to be the child of the latter. The latter is very liable to be the common sense factor that so eloquently marshals the resources of the former.

To summarize: From a rather assiduous perusal of the foregoing experiments and their author's deductions, I do not see any very obvious reason to depart from the well-established principles of surgery already in use in the treatment of shock of injury. The success of surgery still depends upon the native ingenuity of the surgeon and he who lacks it will often have difficulty with "systems."

In treating this condition according to the premises of this paper, one will not transfuse blood, saline, or alkaline, solution, unless there has been a hemorrhage and that hemorrhage is stopped. In case hemorrhage has not been stopped, one would expect an increase of blood volume would increase the already existing hemorrhage. In case of no hemorrhage at all, transfusion is certainly wrong in principle, for it increases the volume of blood and as a consequence increases the work to be carried on by the heart that is already overburdened with shock.

A PLEA FOR A BROADER VIEW OF THE CESAREAN SECTION.

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Years of attention to operative technic and the passing of this potent influence from one generation to another with added emphasis has played a most important part in medicine.

Another important factor is the education of the public to rightly view and grasp the varied moves and ideas of surgery. Years ago, the public was very loath to accept any operative interference. Today, the public invites any standardized surgical procedure when definitely indicated. Why should this all be? It is because we are getting results. Asepsis, antisepsis, technic, team work, special adaptiveness and fitness and general public opinion favoring surgical principles, all have broadened, and today we face a condition of ideas so moulded as to have become established.

The same has held true relative to the Cesarean section. It is no longer considered a formidable procedure. This operation can be done as readily as any other accepted standard operation. The hazards have been lessened, and modern schooling has made this operation equal in safety to any abdominal operation, and far safer than some. Insofar as this part of the argument is concerned, we are free from the average danger and this special procedure is successful in that the mortality of today, in properly selected and prepared cases, is practically *nil* for both mother and child.

However, there is another factor which enters into the field of argument. This factor is the education of the public, and even of some of the physicians, to realize the simplicity of this operation. Too many of the public are willing to wait until the ancient and now obsolete indications for Cesarean section are written upon the countenance of the suffering mother in labor or soon to be in labor.

Each year hundreds of lives are sacrificed because of protracted labor, delayed labor, deformities of the mother remaining unrecognized until too late, the physical unfitness of the mother to endure the strain of delivery per vaginam, intercurrent diseases such as involvement of the kidney tissue or heart muscle, and other similar circumstances. Yes, hundreds of lives are sacrificed each year; and the loss is not entirely an infant mortality problem. It is true that the infant mortality in such circumstances is very high. Eighty per cent of these deaths could be avoided by the Cesarean section done at the proper time. The maternal mortality due to childbirth could also be lowered even to a greater degree.

I was called to a distant city to see a young woman five months pregnant. Two years previous, she had been delivered of a child but only by the morcellation method. The physician stated to me that in nowise would he ever permit this patient to again go into labor. Physical examination revealed a perfectly normal woman, including all measurements. She was willing to go through any reasonable procedure. The formalities of the Cesarean section were outlined to her. She was a woman of high standing in her city, and as the family desired a child, she very readily grasped the situation, and when eight months and two weeks pregnant, Cesarean section was performed. A beautiful baby girl was delivered, and the mother made an uneventful recovery. Her happiness could not be expressed in words.

How many are the surgeons today who had rather remove a rather doubtfully pathological appendix, than to overlook or hesitate to remove the severely involved appendix, and thereby sacrifice a life? If ten patients, each with a questionably pathological appendix are operated upon and eight out of ten appendices show no abnormality, is it not better to remove all rather than overlook the two which would mean either death or a costly convalescence? All show like signs and symptoms. The scalpel is the only instrument that will bring to light the facts, and relieve the conditions. Perhaps one should be acute enough to tell the difference by physical examination, yet where is the surgeon who has that infallible knowledge? If you believe in strict conservatism, would you still be willing to be one of the ten and take the risk of a non-operative procedure at the expense of your health, happiness, responsibility toward your family, and liability of rupture, with its sequel, at any moment? I dare say you would not.

The Cesarean section holds the same place in modern surgery. In fact pregnancies in any standard family are much more numerous than diseased appendices. The fact is the profession owes the function of its science to every one in a doubtful as well as fully decided and clearly seen situation. Ten women who are pregnant for the first time, or who may have lost a child through an error in judgment during a previous labor, may be taken as examples. Each day places these women at a greater hazard as they near the term. Among these ten, perhaps there are four whose outcome and that of the child is in doubt. We admit that two of these four doubtful cases will go to term and deliver a viable child, after a more or less severe form of endurance. In the meantime, the remaining two go to term, and through some misfortune in action or judgment the lives of the little ones are sacrificed and possibly also that of the mothers. How much better it would have been to have performed Cesarean section on all four and thereby saved those who were otherwise lost! Who is there that can infallibly see the future in such cases?

The Cesarean section is a safe and sane procedure today. The previous risks of this as of many other operations have been eliminated. Under proper conditions, and in the cases that are supervised during the carrying period and the operation performed at the time of election, the mortality is no higher than in appendicitis.

One great factor in the Cesarean section is in the proper selection of the time when it is to be done. Of course, this must necessarily be supplemented by aseptic principles and proper technic. In other words, we can safely say today that the Cesarean section is one of the operations of surgical science which has become standardized and is no more dangerous than the average surgical operation. It is only a question of the proper operation properly done.

The Cesarean section should now have reached the stage when it is no longer an operation in emergency, a last resort. Place yourself in the position of the surgeon called in to perform the Cesarean section after hours of protraction, procrastination, digital interference, failure to apply forceps firmly and securely, and numerous other conditions, and you will appreciate the situation confronting you.

The Cesarean section is today an operation for early consideration in all cases of pregnancy where there is any, even a very slight, question of successful and clean aseptic delivery per vaginam. All other methods should not be tried first; under such circumstances the surgeon faces a contaminated field which it is next to impossible to cleanse. I have performed the Cesarean operation upon women who have given birth per vaginam, on multiple previous occasions. It was not done, however, until the woman had been in labor for many hours. No trouble was anticipated in these cases, yet it came. Inertia uteri is as real an indication for Cesarean section as a markedly deformed or contracted pelvis, providing that the muscular activity cannot again be revived. The point is this condition should be very early determined, and action taken immediately.

The old line rules of indications for the Cesarean section have gone by. Present days conditions have evolutionized obstetrics, and drawn it into the field of as truly aseptic and clean work as any in surgery. The obstetrician who fails to use most delicate aseptic technic, falls short of the mark and is seriously in error.

How many women are childless because of the dread of a long and painful labor? If this factor could be eliminated and more healthful children born each year, the stronger will be our nation a few decades hence.

In proclaiming this thought I am aware that I place myself on the defensive. However, I am willing, if by so doing, I can help to popularize this procedure—comparatively simple when properly done. It would save many babies annually.

This short argument would be incomplete without an enumeration of what I believe to be indications for the Cesarean section. The following enumeration is drawn up with the main ideas in mind: to broaden the scope of usefulness of this operation; to lower the infant mortality at birth; to elicit comment, criticism or commendation as the case may be, and thus alter the present basis of thought in connection with this operation.

INDICATIONS FOR THE CESAREAN SECTION.

1. Brow presentation where no progress has been made for six hours and version is contraindicated because of the physical condition of the mother.
2. In concealed hemorrhage.
3. In contracted pelvis.
4. In eclamptic coma.
5. In flat pelvis.
6. In labor complicated by small flat pelvis.
7. In well developed myoma complicating pregnancy.
8. In cases of extreme cervical rigidity.
9. Accidental hemorrhage.
10. Pernicious vomiting after the seventh month.
11. Marked chorea.
12. Advanced cardiac or pulmonary disease.
13. In cases of extreme muscular atrophy of the abdominal wall after a six-hour period has failed to advance the child.
14. Sudden death of the mother after the fifth month.
15. Any intercurrent disease after the sixth month where the continued viability of the child is a factor providing the life of the mother is not put at unwarranted hazard.
16. In cases of previous pregnancies where miscarriages have occurred after the sixth month; standard precautions being taken to extend the time of election to as near full term as reasonable.
17. In any case of questionable safe delivery of a viable child following a consultation of obstetricians and surgeons to at least the number of two each, and a majority favoring.
18. Protracted labor over a three-hour period and no progress even though cause be undetermined.
19. Delayed labor where months of pregnancy have been definitely determined.
20. Any physical unfitness of the mother to withstand labor after proper consultation has proven the fact. Medical, obstetrical and surgical men to the number of three to determine this fact and majority to rule.
21. Extreme kidney involvement, the time of election to be heeded.
22. Inertia uteri covering a three-hour period and other efforts failing to re-establish proper muscular activity.
23. In cases where women avoid pregnancy because of the dread of the pain of delivery, but would have a family if Cesarean section could be done at the time of election. This conclusion being drawn after proper free consultation and explanation to the family.

The above indications are drawn from a rather broad point of view. The main idea is to further the benefits of this operation always inviting a free consultation in each instance. Such a consultation should include the internist, obstetrician and surgeon and perfect collaboration with the laboratory. In each instance, the family should have the situation thoroughly outlined and its endorsement should be procured.

The main purpose of this paper is an effort towards saving some of the ten thousand children now annually lost during labor in this country, in order to enhance the personnel of our citizenship and strengthen our nation.

967 Elm St.

Ureteral Stone and Stricture.

From the history alone one cannot differentiate between utereral stricture and calculus. Given the typical history with which we have been taught to associate the diagnosis of ureteral stone, and without further data it is about as safe to make a diagnosis of stricture as of calculus, because stricture is by far the more common disease.—Guy L. Hunner, in the *N. Y. State Journal of Medicine.*

A CASE OF CEDAR OIL POISONING IN A PREGNANT WOMAN.

Treated by Cesarean Section and Fisher's Solution. With an Experiment to Prove that Cedar Oil was the Cause of the Poisoning.

D. D. DeNeen, B.S., M.D.,
Cincinnati, O.

This case has not been reported earlier because of the author's engagement in the military service.

On March 13, 1917, I was called to Middletown, O., to see a pregnant woman, of 25 years, who had taken cedar oil the night before to produce an abortion. The patient is of the opinion that more than tablespoonful was ingested. Shortly after taking the oil she was seized with convulsions She was placed in the local hospital in the care of Drs. L. S. Grous and B. Sharkey.

Since my train was delayed, I did not see the patient until about 8 P. M., of March 13th. At that time she was in clonic convulsions, with her head thrown back. Her temperature was 104 F.; pulse, 120 and weak; urine loaded with albumin.

At consultation none of us was sure that the convulsions were due to the cedar oil. We were, however, agreed upon emptying the uterus by Cesarian section. Under chloroform anesthesia Cesarian section was performed and the patient relieved of a pregnancy which was about six months advanced. The incision was made through the upper part of the anterior surface of the uterus. The placenta was found in the incision. My hand was thrust through the placenta and the child delivered, then the placenta itself. The uterus was closed with three layers of continuous sutures.

Post-operative treatment consisted of Fisher's solution by Murphy drip. Before morning the temperature reached a point below 100° F. and the albumin was not so abundant. *There were no convulsions after the operation.* The patient returned to her home after about six weeks in the hospital, and is living at this time, which is two years and five months from the date of operation.

An experiment was performed upon a pregnant female bitch weighing 16½ lbs. On May 11, 1917, a tablespoonful of cedar oil (from the leaves) was given at 4:41 P. M. The dog fell to the floor immediately in convulsions, which were clonic in character. Its head was thrown back, and its breathing was stertorous. At 4:45 P. M. there was explosive vomiting of oil and food. At 4:47 P. M. blood was present in the saliva. At this time the dog was insensible to pain and to noise. At 4:52 P. M. the pupils were dilated and the conjunctiva injected. The abdominal muscles were not involved in the convulsions, the eyelids were partly closed, and it was discovered that the extensor muscles were the only ones involved in the spasms. At the beginning of each convulsion the head was first drawn forward and then immediately thrown back. At 5:25 P. M. the dog became hypersensitive to noise. Thick mucus flowed from its mouth, respiration was labored between spasms and there was also batting of the eyelids between spasms. During spasms the respirations were jerky. Death occurred during the night.

An autopsy was held upon the dog May 12, 1917, and disclosed the following: Nephritis, small intestines contracted and inflamed, stomach ecchymotic; odor of cedar oil on opening the abdominal cavity; chicken clot in the heart due to slow circulation.

Since the symptoms were practically the same as those of the woman, the conclusion is that she suffered from cedar oil poisoning.

An Appeal for Embryological Material.

In 1906 I observed certain malformations of the human shoulder-blade, and in contributions to current literature I have given them the collective name—"the scaphoid type of scapula," and pointed out some of its hereditary, clinical and anatomical significance.

One of the most important fields of study of this condition lies in the intrauterine development of shoulder-blades. My investigations in this direction have been limited by the material at my disposal, which has been inadequate. I am, therefore, appealing to physicians for human fetuses in any and all stages of development.

It is desired that the material, as soon as possible after delivery, be immersed in 10% formalin in a sealed container, and be forwarded to my address; charges collect. Due acknowledgement will be made to those forwarding material.

Wm. W. Graves,
727 Metropolitan Bldg., St. Louis.

Suprapubic Bladder Puncture in Retention.

There is absolutely no danger in making a suprapubic puncture into the distended bladder, if done aseptically. It takes only a few seconds, gives immediate relief, and is much more desirable than tediously trying to force one's way by an obstruction, with all the dangers of false passage, traumatism, and hemorrhage. I am sure suprapubic puncture is far too little used in this class of cases.—V. T. La Rose in *The Journal-Lancet.*

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, NOVEMBER, 1919

THE PRINTERS' STRIKE.

THE JOURNAL wishes to express to its subscribers and advertisers appreciation of their patient indulgence during the two months' delay in the appearance of the October issue which was incident to the settlement of controversies in the printing trade in New York City. This (November), the December and perhaps the January numbers will also be late in consequence. We hope, however, that thereafter the JOURNAL will reach its readers early each month, as heretofore.

PRIMARY TENDON SUTURE.

We would call attention to an employment of the Carrel-Dakin system that seems to us a logical adaptation beyond the original purpose for which it was devised. Ordinarily, in wounds of the forearm, hand, foot, dividing tendons and nerves, it is considered best to delay suture of these structures for a few weeks or until there is assurance that no organisms remain in the tissues—during which time tendons retract, their sheaths become distorted, and atrophy begins. It is, however, safe to perform suture of the divided structures at once, if a Carrel tube is so placed in the wound that the Dakin's solution, injected every two hours, bathes all portions. The skin, too, may then be closed, after excising its wound edges. After two or more days, when an aseptic course seems assured, the Carrel tube is withdrawn. In the hours that elapse between the injury and the operation, it is also advisable to thoroughly "dakinize" the wound, either with dichloramine-T in chlorcosane or with Dakin's hypochlorite solution by means of Carrel tubes.

CHARLES F. TAYLOR, M.D.

With the recent death of Charles Freemont Taylor there passed from American medical journalism an interesting and conspicuous figure. Coming to Philadelphia in 1883, he established there a new montly, *The Medical World,* devoted to the publication exclusively of brief practical articles, case reports and discussions, of interest in the every-day work of the general practitioner. *The Medical World* soon acquired, and has since maintained, one of the largest circulations among all the American medical journals. But Dr. Taylor was more than a physician and a medical editor; he was also a publicist, profoundly interested in government problems and in political reforms. He was an ardent advocate of the initiative, the referendum and the recall, and of some form of international government. In the nineties he undertook the editing and publishing of books by governmental experts, and established a quarterly magazine, *Equity,* devoted to political subjects. This magazine he conducted, at considerable financial loss to himself, until a few months ago, when it was merged into *The National Municipal Review.*

Believing that physicians should be good citizens as well as good doctors, Dr. Taylor established about 1894 an editorial department in *The Medical World,* which he called "Our Monthly Talk," in which he discussed municipal government and national policy. These editorials, cogent and based on broad reading, always bore the stamp of deep sincerity and faith in true democracy.

Later, he added another editorial department, "Business Talks to Doctors," in which he discussed the financial problems of medical practitioners—and no doubt saved many of them from the clutches of fake promoters.

Both of these departments Dr. Taylor continued personally to write—in spite of ill-health—until his death. The rest of the editorial work, however, had recently been in the hands of his associate, Dr. John Rommel, who will "carry on." The publication of *The Medical World* will be continued by Mr. Frank Taylor, its business manager for several years.

ANNOUNCEMENTS.

Proctology Issue.

A valuable feature of the American Journal of Surgery has been the publication, from time to time, of special numbers, each devoted to a certain field of surgery and containing articles written for the purpose by acknowledged authorities in those fields. With our entrance into the World War we were constrained to discontinue this valued service because of the absence in the military service of so many American surgeons and of the similar absence of our editor-in-chief and our managing editor.

Now that the American medical profession has had opportunity to settle down again to the routine of civilian surgical pursuits and literary activities the Journal will resume the publication of these special numbers, the subjects and contents of which will be announced. The February, 1920, issue will be a large number devoted to *The Surgery of the Rectum and Colon.* It is to contain the following contributions:

The Diagnosis of Ano-Rectal Diseases, by Alfred J. Zobel, San Francisco; Stricture of the Rectum, by J. Dawson Reeder, Baltimore; Cancer of the Rectum, by Jerome Lynch, New York; Aseptic Amputation of the Rectum, by Edwin Beer, New York; Proctitis, by Martin L. Bodkin, Brooklyn, New York; Perianal Infection, by David A. Kraker, Newark; Fissura Ani, by Lewis H. Adler, Jr., Philadelphia; The Medical and Surgical Treatment of Protozoan Infections, by John L. Jelks, Memphis; Rectal Abscesses, by T. C. Hill, Boston; The Roentgen Ray in the Diagnosis of Ileo-Cecal Valve Insufficiency, by Erwin Reissman, Newark; Notes on Surgery of the Rectum and Anus, by Walter M. Brickner, New York; and articles by Louis J. Hirschman, Detroit; G. Milton Linthicum, Baltimore; Charles J. Drueck, Chicago; and Samuel T. Earle, Baltimore.

Surgical Suggestions.

One of the most popular features, and certainly the most quoted, of the American Journal of Surgery was the editorial department of "Surgical Suggestions," discontinued a few years ago. Reprinted in book form, these Surgical Suggestions ran through several editions; a German translation was published in Leipzig in 1910; permission for a Russian translation was granted in 1914 but we presume that the outbreak of the war interfered with its appearance; recently we have been asked for permission to translate Surgical Suggestions into Spanish. So many requests have been made for their resumption that we have decided to make these "therapeutic hints and diagnostic wrinkles" again a regular part of the Journal.

Radium Therapy.

In spite of much misgiving and many doubts it is now established beyond controversy that radium is an invaluable aid—in some diseases the only valuable aid—in certain affections of the human body, notably in Hodgkin's disease and lymphosarcoma, in leukemia, in some skin diseases, in "idiopathic" uterine bleeding, and in accessible malignant growths—especially carcinoma cervicis uteri and epitheliomata. For the development and establishment of these uses of radium we are chiefly indebted to that pioneer in and persistent proponent of radium therapy, Professor Howard A. Kelly, of Johns Hopkins University. The subject is so important in surgery, the indications for and technic of radium application are familiar to so few, that we have asked Prof. Kelly to give to our readers a practical résumé of "Radium Therapy." This article, illustrated with many convincing photographs, will appear in an early issue of the Journal.

Surgical Sociology

Ira S. Wile, M.D., Department Editor

SAFETY IN BUILDING.

In the development of its work, the Federal Board for Vocational Education has been unusually active in presenting educational material designed to shed light upon various phases of vocational work. Its efforts have centered about the training of persons along various lines, together with making clear the opportunities presenting for securing the academic instruction and the practical experience necessary to make the individuals thoroughly self-supporting.

Bulletin 31 is devoted to A Study of Training Courses in Safety and Hygiene in the Building Trades. Its purpose is to give instruction to those working and to afford suggestions to teachers in vocational schools so that they may give the requisite instruction to students, with a more systematic and complete knowledge of the hazards of the industry than is generally to be found among such teachers.

Safety features in building construction are too frequently overlooked because of the temporary nature of the work and an insufficient realization that accidents are as wont to occur in construction of a temporary nature as in well organized shops. Building regulations, possessing the nature of codes, usually relate to the types of construction, and deal largely with the safety of employees after the structure is completed. The obligation to protect employees during the course of erecting buildings is scarcely recognized, and the entire subject is more or less left to the contractors. The liability companies exert a powerful influence upon the contractors because they require that contractors live up to regulations of their making in order to minimize the danger of accidents with the consequent penalties. The inspectors of such casualty companies follow up the work and report unsatisfactory conditions which are thereupon corrected under the direction of those who have a financial interest in the safety of employees.

Accidents merit considereation not merely because of items of loss due to delay in building operation, lost wages, forfeits for failure to arrive at completion at the promised date, but because they possess a tremendous importance in view of the personal sufferings of employees, and the physical and mental injuries sustained by families forced into dependence or heavily charged with debt incident to the changes in family life resulting from the injury or death of the wage earner.

In the year 1916, the estimated number of industrial accidents in the United States was three million, or an average of ten thousand per day, with twenty thousand fatalities. "It is estimated that these accidents caused a time loss of 105,000,000 days, or 350,000 years of 300 working days each, and a loss of $210,000,000 in wages." It is not possible to rate the seriousness of accidents merely on the basis of time lost, because 90 per cent. of them will be found to cause a loss of time of from a few days to four weeks. All of these accidents, however, have serious possibilities if adequate attention is not given to the victim.

The severity of accidents is greatly intensified by virtue of infections. The injury, itself, too frequently is regarded with indifference, and precautions necessary for proper surgical treatment are not taken. The so-called minor injuries, because of their neglect, present the larger proportion of infections, and, in consequence, result in a prolongation of the disability, and, too frequently, an increase in their effect upon the potential working power of the individual who has sustained them.

Injuries of the hand are responsible for about 15 per cent. of all total disabilities. Approximately 65 per cent. of these manual disabilities result from injuries of a minor character that have become infected. It is patent that serious injuries of the hand are less likely to become infected because of the nature of the accident, which insures prompt attention at the hands of capable surgeons. In all probability, more time is lost and more suffering follows as a result of infection than from the original accident.

In one state, the average time loss of 8,877 infected injuries was 29 days while the average time loss for non-fatal injuries was 12 days. On this basis, the infection of the injuries referred to cost in claims $270,294 more than if no infection had occurred. This is merely representative of a wage loss incident to time of unemployment and fails to measure the decreased earning capacity that frequently followed the infection of what was originally a simple injury, the healing of which might have been uneventful had the proper emergent surgical care been given.

The possibility of reducing accidents has been recognized and conscientious contractors spare no efforts to bring about the reduction of injuries through the institution of safety devices of various kinds. As an illustration of the possibilities, the experience of a single contractor of Springfield, Massachusetts, may be cited. During 1919, the number of accidents per thousand employees was 399; in 1916, 303; and in 1917, 180. Within two years there was a 55 per cent. reduction of accidents, and a 66 per cent. reduction of accident costs.

The necessity for stimulating interest in safety regulations and precautions requires emphasis at this time when there are many evidences of an increased construction requiring the employment of large numbers of men in the building trades. The national campaigns for thrift should, above all, stress the importance of saving manpower and of increasing, or at least, not diminishing the industrial capability of workers. The school systems, themselves, have a tremendous responsibility for teaching the young to realize the value of safeguards of various types and the importance of observing of safety precautions so that a habit of safety will be inculcated. In the building trades, particularly, the item of self-interest is closely bound up in a feeling of responsibility for the welfare and safety of co-workers. The hazards of the trade are not essentially inherent, and most of them may be easily obviated by attention to details and a recognition of the fact that speed in building is not of greater value than safety. Whether buildings be demolished or constructed, whether the work be excavation, blasting, hoisting, the storing of material, the building of scaffoldings, or the manipulation of machinery involved in building operations, there are proper methods of procedure which must needs be followed to avoid injuries to workers, passers-by, or, indeed, those living in the vicinity of the building operation.

The element of chance does not enter into the architect's design, nor in the plans for securing the essential materials for building construction. Nor should it be permitted to exist at any stage of the building operation.

Safety and hygiene are as necessary in building for safeguarding the builders as is provision of safe materials for the success of the building.

Progress in Surgery

A Résumé of Recent Literature.

A Contribution to the Study of Stiff and Painful Shoulder. ALFRED J. BROWN, Omaha. *Surgery, Gynecology and Obstetrics*, October, 1919.

Brown refers to the studies by Brickner, Codman and others, of shoulder disabilities, and adds to the causes of "stiff and painful shoulder" described by these authors, tear of the tendons of the latissimus dorsi and teres major near their insertions.

These cases resemble closely cases of subdeltoid bursitis. They present a point of marked tenderness on the inner surface of the humerus high up in the axilla and in cases of moderate standing an atrophy of the deltoid from involvement of the circumflex fibers.

One is struck by the remarkable similarity of the trauma in many cases. The patient states that he grasped a flying ring in a gymnasium or was hanging to a strap in a car and the car gave a sudden lurch, or he felt he was about to fall and threw down his arm to save himself, or was pitching a baseball and felt something give in his shoulder. In all cases the predominant factor is a sudden sharp adduction of the humerus either in the form of a reflex contraction stopping unexpected abduction of a suddenly applied muscular overstrain as in pitching. In all these motions the muscles thrown into sudden action are the teres major and latissimus dorsi which contract with great violence in order to prevent the sudden and unexpected abduction. Depending upon the time since the injury the condition appears as acute, subacute or chronic.

The three significant signs which point to a disability due to a tear of the fibers of the teres major and latissimus dorsi tendons, other conditions being ruled out by careful examination, are:

1. Pain when the involved muscles are placed on the stretch by the motion of abduction and external rotation in the abducted position.
2. A definite point of tenderness in the tendons of the muscles at or near their attachment to the bone, i.e., high up in the axilla.
3. In the subacute or chronic cases atrophy of the deltoid muscle greater than that from disuse occurring without demonstrable gross nerve lesion.

In the acute stage the treatment consists in immobilization for a short time; active motion begun early for short periods and always within the limits of pain; prevention of new insults to injured or reparative structures by splinting the deltoid and inhibiting motion tending to cause such insult; and local and general massage intelligently employed.

In the subacute stage the patient is encouraged to use the shoulder, but always within the limits of pain. Examination will discover movements which can be performed without pain. These should be pointed out to the patient and he should be encouraged to practice them. Massage should be used and may be more vigorously applied as the object in this stage is to promote a new blood supply in scar tissue which is at least partly formed.

In the chronic and more severe cases it is necessary first to break up the firm scar and fibrous tissue which has formed in the tendons and the adhesions which have formed in the surrounding axillary tissues; also to overcome the shortening of the muscles which has taken place as the result of carrying the arm in the sling position for a considerable length of time. This is best accomplished under an anesthetic. This transforms the condition to one comparable to a case in the acute stage and it should be treated accordingly.

Infected Wounds of the Ankle. P. CHUTRO, Paris. *The Journal of Orthopedic Surgery*, September, 1919. .. ..

Authorities seem to be agreed that whenever the ankle joint is infected and the astragalus fractured, that astragalectomy is indicated. However, even with astragalectomy, unpleasant sequelae follow so often that amputation is not unusual.

Chutro believes that the symptoms are due to the fact that with the foot mobilized at right angles, by apparatus which is not well adapted to the front of the leg, or back of the ankle, the mortise coming into contact with the superior surface of the os calcis. The consequences of this forward dislocation of the foot are:

(1) A disappearance of the retro-malleolar spaces is brought about, the tendon of Achilles, coming closer to the bones of the leg.

(2) The border of the mortise, displaced backward, causes traction upon the flexor of the great toe, and then upon the common flexor of the toes, giving rise to a flexor contraction of the toes, and a plantar flexion of the fore part of the foot. The day that the patient abandons his apparatus, this same contraction of the foot will conduce markedly to the equinus deformity.

(3) The same tension produced by the mortise on the tendons also act on the posterior vasculo-nervous bundles. The circulatory embarrassment is aggravated by the compression of the vessels, due to the disappearance of the retro-malleolar spaces. The return circulation suffers especially, and the foot presents the signs of a permanent, passive hyperemia with cyanosis, sweating, and variations in the local temperature.

(4) The change in the position of the foot, and especially the change in point of contact of the mortise, results in the os calcis, whose anterior part is normally elevated from 11-19 degrees, becoming completely horizontal, even coming in certain cases to present its posterior portion higher than its anterior apophysis. These complications are avoided by Chutro's method of treatment, which is described in his own words, as follows:

In addition to cleaning the wounds of entrance and exit, we perform an incision in the form of an italic "S", commencing above the external malleolus and descending along the anterior aspect of the malleolus to the line of the ankle joint, becoming then almost transverse as far as the prominence of the tendon of the tibialis anticus, then becoming again longitudinal and descending 2 or 3 centimetres. An astragalectomy is done, and when the cleaning of the wound has been done, the foot is fixed in good position.

In order to fix the foot, one passes a bronze wire through the skin and soft parts of the inferior lip of the wound: this wire grazed the posterior superior border of the cuboid, and then following a recurrent path, it traverses the anterior border of the external malleolus and the soft parts of the other lip of the wound. The necessary drainage tubes were placed, and the wire twisted. This partial closure of the wound never presented any ill consequences, because there remained always a large opening, well exposed, which permitted the discharge of pus and liquids.

When the infection had spread to the sheaths of the postero-internal tendons, one added a debridement which extended to the point.

The advantages of this fixation by bronze wire are the following:

(1) The cuboid is brought close to the external malleolus.

(2) The tarsus is projected backward.

(3) The anterior portion of the os calcis retains its normal elevation above the horizontal plane, and flat foot is avoided.

(4) The retromalleolar spaces become deeper than normal.

(5) There is no traction on the posterior tendons, nor compression of the vessels.

(6) The Achilles tendon is not shortened, and there is in consequence less probability of equinus deformity.

(7) The mortise, which is concave, rests above the articular surface of the os calcis, which is also concave: there remains, between the two, a cavity which will later be filled with a fibrous tissue, which will prevent bony anchylosis and will permit a certain mobility of the foot.

(8) The anterior tendons having their points of insertion nearer each other will gain in force and will contribute to the prevention of equinus.

The operation finished, the foot is immobilised at a right angle by a figure-of-eight bandage, extending from the heads of the metatarsals to the inferior ¼ of the leg.

The dressings were renewed at very long intervals, every 15 or 20 days. The bronze wire was removed about the fifth week. The patient commenced to walk on his foot between the fourth and fifth week, without crutch or cane; during the first days he was permitted to lean upon a chair or upon a comrade, but at the end of some days he walked alone.

On Focal Infections As a Cause of Painful Heel. Sigmund Epstein, New York. *Medical Record*, August 2, 1919.

Epstein presents three cases of painful heel, due to three different types of infection, tonsilar, dental and gonorrheal. Each of these was cured by removal of the focal infection. In reference to dental foci, the author presents the following opinions:

1. The results of extraction of teeth are more brilliant than those of root-amputation.
2. Often the beneficial results of removal of septic bridges, and of forgotten or buried septic roots can be felt within a day after the eradication.
3. Do not expect this to happen where there have been marked bony changes around the margins of joints, such as the x-ray shows in the form of osteophytes of greater or lesser size.
4. The results of extraction of septic dental foci are more favorable in younger patients, especially where the symptoms are polyarticular or muscular.

The Fate of the Bone Graft. A Clinical Study. Willis Campbell, Memphis. *Southern Medical Journal*, September, 1919.

Campbell uses 75 cases as a basis for his discussion. He used only autogenous bone grafts. Most grafts were made with the motor saw from the shaft of the tibia. The conditions for which grafts were performed were the following:

1. Deficiencies in the body of the vertebra: tuberculosis, fractures, congenital anomalies, spondylitis deformans. The Albee operation is required, which consists in splitting the spinous processes of at least seven vertebrae, making a gutter or trough in the midline, into which a graft of equal length is inserted from the tibia. The object is fixation, prevention of deformity and indirectly affecting the diseased process.
2. Congenital deficiencies: congenital absence of whole or of parts of bones.
3. Acquired deficiencies: trauma, infection, tumor, etc.
4. Ununited fractures.
5. Fixation of joints when motion is undesirable, as in paralysis, and to produce ankylosis in diseased joints in tuberculosis, arthritis deformans, and extreme trauma.

From a close analysis of these cases he presents the following conclusions:

1. In adolescents and young adults, grafts are more vigorous and apparently act as a living, integral part, showing no disintegration, but a gradual increase in size and thickness.
2. Every evidence indicates the inlay as the physiological method. The intramedullary graft should not be employed where osteogenesis is feeble.
3. Spinal grafts in young children, and probably in adults, are absorbed.
4. The graft may be inert or very feebly osteogenetic but mechanically perform the function for which it was employed,—as in the neck of the femur (dense into spongy bone).
5. From the x-ray pictures in a few cases bone appears to form in strata about the original graft very much as an involucrum about a sequestrum, 'though no definite evidence of such action has been produced.
6. Further study of a larger number of cases over a longer period of time is necessary before definite statements can be made.

Primary Suture of Gunshot Wounds. With some remarks Upon the Application of Similar Principles in Civil Surgery. Sumner L. Koch, Chicago. *Surgery, Gynecology and Obstetrics*, October, 1919.

Of the surgical advances which the experiences of the war have brought, one of the most important, from the standpoint of the civil surgeon, is the knowledge that, under appropriate conditions, recent infected wounds may be excised, surgically cleansed, and sutured, with the confident expectation of primary healing in 85 to 90 per cent of cases.

In the lacerated and contused wounds of emergency and industrial surgery, as in comminuting gun shot wounds, the chief difficulty, aside from anatomical considerations, lies in determining the extent of injury, and in removing all the damaged structures and tissues whose blood supply has been destroyed. With crushing wounds, the surgeon will remember that the degree of injury is usually more extensive than may appear in the first few hours. The result of trauma to the blood supply appears gradually through 24 to 48 hours, so that tissues which appear fairly normal at operation may show definite evidences of gangrene 24 hours later.

Adequate incisions, with an exposure of the injured parts that will permit the operator to see clearly into every corner of the wound, are absolutely essential to success. If the damaged tissues are completely excised an eight-inch incision will heal as rapidly as one of four inches. The use of a staining solution such as methylene blue or brilliant green, as advised by LeGrand, Wilson Hey and others, may be of help in recognizing recesses of the wound that might otherwise escape attention. Complete control of hæmorrhage and obliteration of all dead spaces without undue tension have been frequently shown to be of primary importance. Dispensing with the constrictor at the earliest possible moment will aid the operator in determining whether the tissues left behind have an adequate blood supply. The contraction of the stimulated muscles when the paralyzing effect of the constrictor has been removed will also help to show the vitality of the tissues.

In cases of doubt, the procedure of loosely packing the wound after excison with gauze saturated with 1:1000 flavine solution, or with liquid paraffine, and waiting for 48 to 72 hours before completing suture, seems to be of distinct value.

Koch reports several interesting cases, with the following statistical summary:

Of 116 flesh wounds treated by primary excision and suture at a base hospital on an average of 49.81 hours after injury, 99 (85.3 per cent) were completely successful; 11 (9.5 per cent) were partially successful; 6 (5.2 per cent) were complete failures. Of the failures 5 were due to infection with hemolytic streptococci.

Of 45 wounds complicated by a wide variety of bone, joint, nerve or tendon injuries, operated upon after a similar interval of time, 26 (57.7 per cent) were completely successful; 17 (37.7 per cent) were partially successful; 2 (5 per cent) were failures.

Of the total, 77.6 per cent were completely successful; 17.4 per cent were partially successful; 5 per cent were failures.

Of 37 wounds excised at the front on an average of 16.3 hours after injury, and sutured at the base 62.6 hours later, 31 (83.8 per cent) were completely successful; 3 (8.1 per cent) were partially successful; 3 (8.1 per cent) were failures. The successful cases included 9 complicated by bone or tendon injury.

The Treatment of War Wounds of the Joints. Pierre Duval, Paris. *Surgery, Gynecology and Obstetrics,* September, 1919.

Duval traces the remarkable improvement in the treatment of joint wounds, from the early days of the war to the years, 1917 and 1918. He describes the revolution which has taken place from the early days of wide arthrotomy and drainage, with its terrifying and disastrous results, both as to life and function, to the later days of excision and immediate suture, with wonderful improvements as regards conservation of both life and function.

The pathological basis for immediate closure of joints is found in the fact that the synovial membrane is very resistant to microbic infection, as well as the synovial fluid, and that these structures remain sterile for 36-48 hours after the surrounding tissues are actively infectious. Early operation and suture of the synovia therefore has a definite scientific basis, aside fom the fact that results obtained by this method are so remarkable.

Total immediate suture of wounds of the joints, preserving the maximum amount of bone surface, was finally adopted generally, in 1917, after a period of hesitation, after the more apparently conservative methods had all been found wanting.

The principles generally recognized now in war wounds of the joints are:

1. Operation as early as possible.
2. Complete operation, that is removal of all foreign substances; total excision of the tract of the missile.
3. Careful cleaning of the fractured surface, complete suture of the joint without drainage.
4. Active and immediate mobilization.
5. Preservation of parts to as great an extent as possible, immediate resection being limited to injuries with extensive communication.

The technic varies with the case. There are two general methods: (1) treating the peri-articular wounds first, gradually proceeding to the joint; (2) treating the joint injury first and the peri-articular wounds, after. Duval pefers to do the arthrotomy first, cleans the joint, treats the fractured bone surfaces, resects the damaged synovial membrane, and closes the joint before proceeding to the treatment of the wounds of the soft parts. But the reverse order has yielded splendid results also.

The arthrotomy incision should be ample,—in the elbows, either internal lateral, external lateral or midline posterior incision. For clear exposure it may be necessary to divide the external lateral ligament. In the knee-joint, either the U-incision with section of the patellar ligament or unilateral or bilateral incisions may be used, according to the indications in the case.

The treatment of the bone injury is of utmost importance. In limited injuries the bone is simply superficially cleansed, particularly if the operation is done within 8-12 hours after the injury. When possible, bone cavities should be left extra-articular, which can be done if the synovia is properly sutured. If necessary, they may be left opening into the joint, or filled with wax, or free muscles flaps. Tissues should be scraped clean; displaced bone fragments should be replaced; occasionally nails, screws, or wires may have to be used to maintain apposition.

Serous fluid should be completely dried out. Antiseptics, even ether, should not be rubbed over the surfaces. Final suture should be in layers preserving anatomical lines as far as possible. No drainage should be used. Important tendons, like the triceps or quadriceps should be sutured at the same time, if torn. Active immediate mobilization of the joints as advocated by Willems, is the method of choice in post-operative treatment.

The above method of surgery can be applied up to 24 or 36 hours after the injury. When purulent arthritis has developed, early resection of the joint gives best results.

The author presents photographs and statistics showing the decided improvement in results since the early days of the war.

Treatment of Infected Bone Wounds. Frederic J. Cotton, Boston. *The Boston Medical and Surgical Journal,* September 25, 1919.

Cotton presents a series of cases of bone infections studied at U. S. A. General Hospital No. 10, from which he draws a very hopeful outlook for the ultimate cure of all such cases in the future. The essential factor in the treatment is "antisepsis," preferably by means of the Carrel-Dakin technique. There were 346 cases admitted, with 182 operations. There were only two amputations, one for a hopeless crushing of the knee, the other for a limb rendered worthless by paralysis. There were no cases of secondary osteomylitis after cleaning operations. The operations consisted, as a rule, of removal of sequestra, and opening of the wound so as to permit thorough irrigation with Dakin's solution. Occasionally large bone cavities were sterilized with 95 per cent carbolic acid and filled with bone wax. The results in these cases were also good. Or wax may be used after sterilization by the Carrel-Dakin method.

Infections of Wounds of War, with Special Reference to Gas Gangrene. Roswell T. Pettit, Ottawa, Ill. *Journal of the American Medical Association,* August 16, 1919.

Pettit gives a review of the infected wounds of war assigned to Evacuation Hospital No. 8, during the St. Mihiel and Argonne-Meuse operations. An effort was made to obtain clinical information as to the time between injury and operation, effects of exposure and cold, of shock and hemorrhage, character of wounds, effects on local circulation, nature of the soil of battlefields and the influence of operative interference. Special effort was also made to secure the more important anaerobes and the hemolytic and nonhemolytic streptococci in cases in which gangrene developed. During October, it frequently happened that over 200 patients were operated on under general anesthesia within twenty-four hours, and between Sept. 10 and Nov. 13, 1918, 4,471 patients were admitted to the hospital. Nearly all of these received wounds in action, of which 2,993 were single and 1,387 multiple. The distribution of the wounds is shown in a table. In 206 cases, amputation was necessary, and during the period named there were 363 deaths in the hospital, gas gangrene being the most important cause (in 5 per cent. of the total wounded). This hospital received only the more seriously wounded, which accounts, in part, for the high incidence. Experience indicated that early surgical interference is one of the most important factors in the avoidance of gas gangrene. It occurred most frequently in the heavily muscled part of the body, the highest incidence being seen in the wounds of the shoulder and the leg, and in the arm, buttocks and thigh, in the order named. As transportable patients were quickly evacuated, bacteriologic examinations were limited to those that could not be removed. The methods used are described. Of 890 wounds examined bacteriologically, 478 (53 per cent.) were found to contain anaerobic bacilli, and 321 of these 478 (67 per cent.) at no time showed evidence of gas infection. Thus, in the experience of Pettit, more than two-thirds of the wounds anaerobically contaminated did not develop gangrene during an observation of at least five days, and often more than two weeks. In 139 cases in which cultures were taken directly from the wound, *Bacillus welchii* was found with other anaerobes in 65 per cent. Chain-forming cocci were found in 219 wounds examined, one-third of them hemolytic, and the results show that the streptococcus was no more frequent in gangrenous than in non-gangrenous wounds.

The Futility of Bridging Nerve Defects by Means of Nerve Flaps. Byron Stookey, Major, M.C., U.S.A. *Surgery, Gynecology and Obstetrics,* September, 1919.

Stookey reviews the statistics of nerve-flap operations, and presents 23 cases, bridged by various sorts of flaps. He is convinced that the fundamental principle of the operation is wrong, and the clinical results disappointing. His own summary of the work is as follows:

1. The repair of nerve defects by means of nerve flaps has not been definitely supported clinically, as evidenced by a clinical study of reported cases.
2. Experimentally, it has been shown, that nerve flaps do not act as conducting paths for the down growing neuraxones.
3. Nerve flaps, whether central or peripheral, are merely degenerated partial nerve segments. Continuity and union of neuraxones does not take place at the point of suture.
4. To avoid fallacious deductions it is important to distinguish between the level of the injury to the nerve trunk, and the level at which muscular branches arise.
5. Abnormal communicating branches are not rare, particularly between the median and ulnar. Such anomalies must be taken into consideration in any careful study of nerve injuries.
6. Judging from the level of the lesion, muscles may not be presumed paralyzed, but must be demonstrated paralyzed.
7. Total movements may not be offered as evidence of the return of function. The action of individual muscles must be given.
8. Reports of peripheral nerve injuries, to be of value, must be accompanied by motor, sensory and electrical findings.
9. By the formation of nerve flaps from the central stump a portion of the nerve from which neuraxones must grow is removed. Distal as well as central flaps may destroy muscular branches. By reversing the flaps they are taken out of their field. Thus the down growing neuraxones are prevented from reaching the muscles through these muscular branches, even were regeneration to take place.
10. The nerve-flap method to bridge nerve defects should be discarded in peripheral nerve surgery.

A New Sign of Nerve Regeneration. Isador H. Coriat, Boston. *Boston Medical and Surgical Journal,* August 7, 1919.

Coriat discusses the new and important sign discovered by Tinel, the so-called "signe de fourmillement," the appearance of formication or tingling produced by pressure. This test when taken in conjunction with the return of electro-conductivity and selective sensory regeneration forms a triad of signs of regeneration of nerve, which is very important in order to determine whether spontaneous nerve repair is going on or whether sutures should be performed.

The test is accurately described in Tinel's "Nerve Wounds." When compression or percussion is lightly applied to the injured nerve trunk, we often find in the cutaneous region of the nerve a creeping sensation, usually compared by the patient to that caused by electricity. It appears about four to six weeks after the injury, and must be distinguished from pressure pain which occurs at the site of the injury, and not in the area of cutaneous distribution. As nerve regeneration progresses the sign is elicitated further down along the course of the nerve. If the point of pressure remains stationary for a length of time we are warranted in concluding that regeneration has stopped.

The test is very easily applied, but should be carefully done in each case, as the tingling produced by neuroma formation may lead to error. In neuroma formation or in the early stages of regeneration without neuoma formation, the formication is limited to the level of the lesion. In the neuroma formation also, where the regenerating axis-cylinders are blocked and may consequently lose themselves in the surrounding tissues, the formication remains fixed at the level of the lesion. In actual regeneration of the nerve the formication progresses over the zone of the growth of the axis-cylinders and can finally be detected along the partial or entire cutaneous distribution of the nerve. For a time it may involve the entire cutaneous distribution, but as regeneration becomes complete, it finally can be detected only in the extreme periphery.

The exact cause of this formication it is difficult to state, but since it can be produced by a far lighter pressure than formication in an uninjured nerve, it probably is due to an increased sensitiveness of the young axis-cylinders. It is best, however, not to rely upon the formication sign alone. The test should be carefully correlated with the other investigations of the nerve lesion, such as protopathic and epicritic sensibility, regenerating pain points, and electrical reactions.

Traumatic Head Surgery. Charles W. Roberts, Atlanta. *Southern Medical Journal,* September, 1919.

1. Lacerations of the soft parts should not be looked upon as simple conditions. The frequency of brain abscess following such injuries does not justify this viewpoint.

2. All depressed fracture cases should be operated upon. Late epilepsy, or interference with the highly organized cortical centers, demands this method of treatment.

3. The important factor in a head injury case is not the presence or absence of fracture of the vault or base. Patients most seriously injured commonly have no fracture at all, and, conversely, the simpler types of brain injuries are frequently associated with tremendous linear or depressed fractures. Often these apparently alarming fracture cases are saved by the very enormity or extent of the rent in the bone, permitting quick drainage of free blood and the fluids resulting from rapidly ensuing edema.

4. The study of a head injury patient, and the method of treatment required, hinges upon the question of intracranial pressure. The elevation of depressed bone, the removal of loose bone fragments, the checking of hemorrhages and the repair of soft parts are the simple incidents connected with a given case. A gradually increasing intracranial pressure, as evidenced by a rising pulse pressure but more accurately by frequent resort to the ophthalmoscope and the spinal mercurial manometer, should be convincing proof that a cranial decompression and drainage should be performed.

5. The decompressive effect of a craniectomy is dependent upon the area of bone removed and fails to be of value unless the dura is widely opened and left open. The old-fashioned trephine should be discarded and remembered only as of historical interest.

6. The diagnosis of "concussion of the brain" should be held in reserve for that class of cases suffering only temporary symptoms. The lack of a proper understanding of the significance of this term negatives scientific investigation and the effective handling of many cases.

Intraocular War Injuries. R. D. Sleight and Wilfred Haughey, Battle Creek. *Journal of the Michigan State Medical Society,* September, 1919.

The authors discuss and comment upon the six laws of La Grange, adding a seventh of their own.

First Law.—Injuries to the inner coats of the eye may be caused through commotion of the air from the explosion of a shell at some distance. There are also well authenticated cases of luxation and subluxation of the lens, and of traumatic cataract, caused in this way. The fundus lesion usually seen is a rupture of the choroid or retina or both at the posterior pole.

Second Law.—Injury to the orbit by traumatisms of the frontal region and radiating fracture of the orbital vault, usually involve the optic foramen or sphenoidal fissure and cause lesions of the sensory, motor, and optic nerves, the eyeball itself being uninjured.

Third Law.—Injury to the facial bony structures, but not involving the orbit, produces lesion of the eye, by concussion, at the macular region. This was found to be the commonest cause of impairment or loss of central vision, but the type of fundus lesion is not constant.

Fourth Law.—Injury to the facial bony structures producing fracture of the orbit, with more or less depression of its walls, without striking the eyeball, produces two types of fundus lesion: macular and paramacular changes by concussion, and peripheral fundus lesions at site nearest the injury to the orbital wall.

Acute Mastoiditis. THOMAS J. HARRIS, New York. *The Laryngoscope,* September, 1919.

Harris confines his remarks to cases of acute mastoiditis that complicated measles and influenza at General Hospital 14, Fort Oglethorpe, Ga.

Of 1,687 ear cases treated 607 were cases of measles. The striking clinical feature of these cases was absence of pain in the ear. If free drainage was not established early acute mastoiditis appeared, as a rule without pain. The reason for this absence of pain is not apparent. A thick outer cortex and general stupor were doubtless factors. With early operation recovery was slow but uneventful. Nitrous oxide and oxygen proved a very satisfactory anesthesia.

Otitis media is not a frequent complication of influenza. Of 7,000 cases only 120 instances of acute middle ear suppuration occurred. All patients had fever, some had pain. The appearance of the drum membrane was characteristic, the distinctive features being the bleb formation. There was no uniformity in the nature of the organism.

The slow healing of the operated cases may be accounted for by the poor general condition of the patients.

Acute Otitis Media Purulenta and Acute Mastoiditis at the Base Hospital, Camp Stuart, Va. JOSEPH D. KELLY, New York. *Medical Record,* September 6, 1919.

Kelly presents the statistics and conclusion drawn from 200 cases of purulent otitis media and 48 cases of mastoiditis. He describes the technique used in the treatment and scientific study of these cases. The following inferences seem to be warranted.

1. It is very difficult to obtain a pure culture or to know the inciting organisms in acute purulent otitis media.
2. Mixed cultures will invariably be present after 24 hours of discharge.
3. The presence in a discharge of virulent pyogenic organisms does not necessarily mean that mastoid involvement will follow.
4. The individual anatomical characteristics of the mastoid may not be a deciding factor in the development of mastoiditis.

Recurrences after Operations for Empyema. FRANKLIN A. STEVENS, Boston. *Journal of the American Medical Association,* September 13, 1919.

Final results of operations for empyema can be ascertained only after a considerable period, varying in length according to the infection, the size and the shape of the cavity, and the treatment followed. The minimum of recurrences occurs when the sinus has been completely obliterated after treatment, and they are more frequent when a cavity containing air is left. If the Carrel-Dakin treatment is used to sterilize the cavity, the chances against recurrence are better. Two other possible causes of recurrence are mentioned, namely, isolated and undiscovered pus collections or sequestration of a part of the original cavity by contraction of its walls. Stevens has had the opportunity to complete the records of 123 cases, first observed at Camp Lee, Va., and later at General Hospital No. 12, at Biltmore, N. C. These fall into two groups, one of 100 treated by simple drainage, and the other twenty-three treated by preliminary aspiration until the first infection had subsided, and later by thoracotomy and use of a surgical solution of chlorinated soda. Forty-four of the first group were persistently and obstinately chronic until the Carrel-Dakin method was used. In only ten of these was the thoraco-plasty of moderate extent finally indicated. Among the cases healed under simple drainage, there were recurrences within eight months in fourteen. Ten of them were due to the hemolytic streptococcus, the original infection. Among the cases healed under the Carrel-Dakin treatment, there were eight recurrences. The efficacy of this treatment was shown by the higher percentage of the good results, and the group treated by this method showed that the pus pockets discovered were usually at some distance from the original focus. In these secondary foci there were two symptoms of value: (1) the failure to regain the normal weight or even the loss of weight, in spite of treatment, and (2) the rapid pulse rate and the moderate fever that accompanied all cases of recurrence with pus secretion. These points are illustrated by two case reports. The details of the findings in these cases are given. Stereoscopic plates were usually necessary in diagnosing the condition. The treatment depended on the character of the fluid. When it was clear and sterile, aspiration was all that was needed. In all the cases of recurrence, with the exception of one, in which the cavity was completely evacuated at the first aspiration, all the purulent fluids were drained by thoracotomy. In many instances in which there were repeated recurrences at the original site, necrotic bone fragments were found, and there was required the greatest care, and the co-operation of surgeon, interest and roentgenologist.

Tight Strictures of the Esophagus in Children Due to Lye Burns. GEORGE F. KEIPER. *The Laryngoscope,* September, 1919.

Keiper refers only to cases of stricture of the esophagus that cannot be dilated by ordinary instruments. Water hunger must be relieved. Haste in dilating the stricture is to be deprecated, as perforation may be produced. No bouginage should be performed until lateral and antero-posterior *x*-ray plates have been made. Always use an illuminated esophagoscope in bouginage. One should oil the instrument and be gentle in all manipulations. Use no anesthetics. The Jackson modification of the Guisez instrument is recommended.

Treatment may require six months or more.

A Preliminary Note on the Value of Repeated Small Blood Transfusions in Blood Stream Infections. JOHN OSBORN POLAK, Brooklyn. *The American Journal of Obstetrics,* September, 1919.

Polak has treated four cases of thrombo-phlebitis with one death, and seven cases of bacteremia, with one fatality, by this method. These were all post-partum cases. The deaths occurred in patients far advanced when treatment was begun.

Small transfusions of citrated blood are given every third day, care being taken not to use the same donor for more than two transfusions. 250-300 cc. are given very slowly. One-third gr. of morphine by hypo before the transfusion diminishes the severity of the reaction, which occurs in 60 per cent of the cases. Polak believes that small repeated blood transfusions increase the cellular elements, stimulate resistance, raise blood pressure, and hence add to the natural defense.

Pre-Operative and Post-Operative Blood Pressures. JOHN O. POLAK, Brooklyn. *American Journal of Obstetrics,* August, 1919.

After a long series of studies on blood pressures, taken before, during and after major operations, Polak presents the following conclusions:

1. That the pulse pressure is the test of the muscular strength of the individual woman's heart, when endocardial lesions can be excluded. The index of the muscle competency is shown by the relation of the pulse pressure to the systolic pressure which should be 1 to 3 or more, if the compensation is adequate.
2. That the efficiency of the kidney function is directly dependent upon the cardiac force of the individual, provided the kidney structures are normal or approximate the normal.
3. That ether anesthesia of an hour does not disturb the relation of the pulse pressure to kidney function, unless the operation is accompanied by considerable loss of blood.
4. That when the pre-operative kidney function is low, the pulse pressure must be relatively high, to compensate for the deficiency, for it does no good to add saline solu-

tion by skin or bowel, or by infusion, unless there is sufficient cardiac strength to take it up and carry the column along.

5. When both the pulse pressure and the "phthalein" output are low, or the relation of the pulse pressure to the systolic pressure is as 1 to 2, the operative prognosis should be guarded.
6. That morphine, in large doses, used during operation, seems to help in diminishing the shock, but has a definite effect in diminishing the kidney output.
7. In the majority of cases there is a moderate fall in both the systolic and diastolic blood pressure, following ether anesthesia, the inhalation of oxygen after the withdrawal of the ether diminishes this fall, but its effect is only transient.
8. In cases of shock, especially where there has been much blood lost during the operation, the fall in systolic pressure is greater than after a long operation without blood loss.
9. The pulse pressure is a better index of hemorrhage or cardiac failure than the systolic pressure, and finally, there is a constant rise in the leucocyte count in the presence of actual hemorrhage, while the leucocytes fall in shock.

A New Procedure for Total Hysterectomy, by Means of Aseptic Section of the Vagina, Without Vaginal Drainage. Dr. M. Gudin, Rio de Janeiro. *Paris Medical*, September 13, 1919.

Gudin has observed that the mortality following radical excision of the uterus for cancer is due almost always to secondary ascending pelvic infection, extraperitoneal, with the vagina as the source of entrance. In order to obviate the possibility of vaginal infection and abolish the necessity for vaginal drainage, Gudin advises the following procedure. When the uterus is freed, ureters isolated, and the vagina about to be cut across, the vagina is grasped in its entire thickness, by two large hysterectomy forceps. The incision is made between the two forceps, and the vaginal stump cauterized with actual cautery. This surface is now sterile and can be sutured and closed. Vaginal drainage is then unnecessary, and the post-operative mortality is considerably diminished.

Results of the Examination of the Prostrate and Vesicles in 125 Cases With Negative Venereal History. George Gilbert Smith and Henry Klein, Boston. *Boston Medical and Surgical Journal*, September 4, 1919.

In order to determine in what percentage of cases arthritis was due to focal venereal infection the authors present detailed statistics of their study.

Of the patients whose examinations are recorded, 107 were men between the ages of 20 and 30; 15 were between 30 and 35, and three were older than 35. In this study, age seemed of no importance. The men were questioned carefully as to the possibility of a past infection. Of the 388 men examined, there were only 150 who denied venereal disease. The fact, reinforced by impressions of the honesty of the men, leads to the opinion that the truth was told in all but perhaps a very few instances.

Of the 125 cases with negative venereal history comprising the series, prostatic massage produced no secretion at all in 18. In 72, the secretion expressed showed no pus at all. In 10 cases, the count showed an average of 2 leucocytes or less per field. These cases were arbitrarily considered as not showing sufficient evidence of infection to be called examples of "prostatitis." Thirteen cases gave a count of more than two leucocytes per field.

These cases may be said to have prostatitis or vesiculitis. In none of them was the examiner able to say, on the evidence of palpation, whether the prostate or the seminal vesicles were chiefly concerned. The authors were impressed by the unreliability of the information gained by palpation alone. Many cases that had no pus in the secretion had hard prostates or distinctly palpable vesicles. Others, whose secretion contained much pus, had soft prostates and vesicles which certainly did not feel indurated. It is perfectly possible that the cases with indurated vesicles or sclerosed prostates, but with no pus in the secretion, have at some time had an infection, and that this infection had died out, leaving scar tissue.

Including all the cases noted as having had no venereal disease, 16 cases out of 125 showed more than 2 pus cells per oil immersion field and might therefore be said to have prostatitis or vesiculitis. Cases with indurated vesicles but with no pus in the secretion are not included. In this series of 125 cases, therefore, about 13 per cent of the men who had no venereal disease, showed definite signs of a prostatitis or vesiculitis. In practically all of these, there were no symptoms referable to the prostatic condition, nor did it seem, in any of these cases, as if their arthritis was due to infection from this source.

Book Reviews

The Pituitary. A Study of the Morphology, Physiology, Pathology, and Surgical Treatment of the Pituitary, Together with an Account of the Therapeutical Uses of the Extracts Made from This Organ. By W. Blair Bell. Octavo; 348 pages; illustrated. New York: William Wood & Company, 1919.

This book is an excellent monograph on the pituitary gland. Originally Bell's interest in the subject lay in the relationship of this gland to the female reproductive organs but gradually his investigations led him into a study of this gland from many points of view, so that this book represents a very comprehensive discussion of the pituitary body as to its morphology, physiology, its disorders with their medical and surgical treatment; there is a final portion devoted to the therapeutic uses of pituitary extracts in general.

The first part of this volume deals with the embryology, the anatomy, both gross and microscopic, of the pituitary to which is added a full consideration of the comparative morphology of the organ. For the special student all this is important, yet to the clinician also it has a distinct value, since it makes clear why and how the anterior position, the posterior position, and the stalk of the gland have distinct origins and functions. Obviously, the next step is a detailed exposition of the physiology of the gland and this the author presents in *part two*. Here he divides the discussion under two headings: (1) investigations by physiological methods, (2) investigations by patho-physiological methods. Under (1) he considers (a) histological researches , (b) chemical examinations, and (c) injection, absorption, and ingestion experiments. Under (2) he discusses (a) operative procedures, *i. e.*, extirpations, stimulation of the pituitary, (b) operative procedures on correlated organs, (c) stimulations of the pituitary indirectly, *i. e.*, injection of toxins or bacteria parenterally or into the bloodstream or peritoneal cavity.

The physiology of the pituitary discussed in this orderly and thorough fashion makes a distinct impression on the reader. One readily understands that this organ has definite and, in some instances, measurable properties and their bearing upon the health or diseases of man is vital. Many of the results obtained after experimentation, much of which is ingenious, is quite convincing, as for instance, the effect of extracts of the posterior part of the gland upon the uterus, the bladder, and the milk-containing mammary gland. The phenomenon of tachyphylaxis, wherein a repeated dose of this extract causes a fall in blood pressure upon an initial rise from the first dose, has direct and practical significance for the clinical surgeon. And this is true to the same degree of the effects obtained by surgical changes in the gland. Bell, carefully leads us over the epoch-making work of Paulesco and of Cushing and then clearly and accurately describes how he carried out his own surgical investigations which led him to the results and interpretations enumerated by him. In the review it would lead us too far afield to dwell at length on this portion of the book, yet nothing in the volume is more interesting and valuable than these considerations, though portions may be controvertible.

The disorders of the pituitary contain, of course, the well-known clinical pictures such as acromegaly and dystrophia adiposogenitalis. In the light of the experimental studies these clinical entities take on a new significance though by no means are they thoroughly understood. The disorders of the pituitary are not all amenable to therapy but it becomes evident (as the purpose of the book plans us to see) that some disorders are distinctly remediable. Surgically, one may expect good results in extrapituitary tumors producing symptoms; medically, the use of pituitary extracts, may bring palliative and gratifying help and relief from symptoms of hyper- or hypo-pituitarism.

Not least important is it to realize that pituitary extracts are of definite value in some obstetrical conditions, for shock and collapse, as a diuretic and in a number of conditions, heterogeneous but distinct, where possibly more than one endocrine organ is at fault.

The book is intelligently illustrated with clear pictures and graphs.

Sterility in Women. By Arthur E. Giles, M.D., B.Sc. (Lond.), M.B., Ch.B. (Vict.), F.R.C.S. (Edin.), M.R.C.P. (Lond.), Captain, R.A.M.C., (Temp.), Senior Surgeon to the Chelsea Hospital for Women; Gynecologist to the Prince of Wale's General Hospital, Tottenham. Small octavo; 227 pages; 11 illustrations. London: Henry Frowde, Hodder & Stoughton, Oxford University Press, 1919.

Giles' monograph is sound, complete and methodical. Perhaps because of an overplus of method and of statistics it is dry reading. The statistics of the author's own cases are rather meager for so ambitious a work—some 530 cases—but he quotes freely from the literature. Nothing new is found in this book, but it gives an unbiased review of the subject, a large bibliography is appended, and many case histories are quoted at length.

In his introduction the author mentions that the subject of sterility has assumed increased importance since so many young and vigorous men have lost their lives during the war. While this is true, the economic importance of sterility is infinitesimal when compared to the influence of prevention and of abortion. Sterility results in deprivation of the few (possibly 10 per cent) who long for children; Malthusianism has a devastating effect upon an entire nation when carried to excess.

Atlas of Operative Gynecology. By Barton Cooke Hirst, M.D., Professor of Obstetrics, University of Pennsylvania. Quarto; 292 pages; 164 plates; 46 figures. Philadelphia and London: J. B. Lippincott Company, 1919.

The advent of an Atlas of Operative Gynecology by the author of well-known and popular text-books on gynecology and obstetrics is an event of some importance in medical literature. The author has many years of experience as a teacher and operator; therefore his views and impressions, his judgment and advice are worthy of consideration.

As Hirst says in his preface, "the text has been subordinated to the illustrations." The illustrations, though large, clearly printed in two colors and technically well executed, are frequenty wanting in detail, and in some instances are not true to nature. Therefore in some cases they may prove misleading to the student whose knowledge is derived solely from their perusal. As examples may be mentioned, Plate XXIII, in which a complete perineal laceration is depicted with the sphincter nicely contracted; in Plate XLVIII, designed to show the bladder pushed back in an operation for cystocele, the illustration shows neither the reflected bladder nor the fascial edges through which the sutures are passed. As another example, Plate CXXVIII, the concluding step in abdominal hysterectomy, shows a peritonealized cervical stump in the lower angle of the wound as if the stump had no connection with the remains of the broad ligament and pelvic wall. Plate LXI describes the sutures in the flap-splitting operation for vesico-vaginal fistula; there are no sutures overlapping the angles of the bladder wound, a step regarded as essential by all experienced operators.

It is the absence of many little wrinkles, short cuts and technical refinements, surely known to and practiced by Hirst, which disappoint the reviewer and detract from the value of the atlas.

The most important contribution of the author is a new perineorrhaphy described as "rational." It is designed, by incising both layers of the triangular ligament, to expose the levator fibers and suture them. Plate XIV shows a vertical gap in the levator sling (the patient being in the lithotomy position) and a running suture closing this hiatus on each side of the vagina. The reviewer is free to confess that he has never encountered an injury of the pubo-rectal fibers running in this direction. Anatomically the gap corresponds to the interval often noted between the pubo-rectal and ischorectal portions of the levator, which doubtless may be increased by the trauma of labor, but plays a minor part in rectocele and perineal laceration. The operation, moreover, does not take into account the so common prolapse of the vagina known as high rectocele.

Hirst still advocates "intermediate perineorrhaphy," repair being practiced four to five days post-partum. He likewise considers a week of waiting in acute salpingitis usually sufficient to allow the stormy symptoms to subside.

The author opposes the tendency to operate upon prolapse by vaginal hysterectomy, and also justly considers pubiotomy an inadvisable operation. In extra peritoneal (really transperitoneal low corporeal) Cesarian section, suture of the uterine and parietal peritoneum is advised *after* delivery of the child, because the soiling of the peritoneum during operation is not to be feared while peritonitis due to the breaking down uterine wound is the real danger.

A concluding section takes up the treatment of mammary tumors, which, according to Hirst, are often brought to the gynecologist's attention.

This atlas, while containing much of interest to the specialist and advanced student who is able to pick and choose the good from the bad, requires considerable revision before it will fulfil its designated mission.

A Stereoscopic Atlas of Plastic Surgery of the Face, Head and Neck, with Case Reports. By Joseph C. Beck, F.A.C.S., and Ira Frank, M.D., F.A.C.S., Chicago, Ill. St. Louis: C. V. Mosby Co., 1919.

This unique set of stereoscopic pictures of plastic operations on the face, head and neck is intended to present a definite and simple course similar to the one that the authors gave to Medical Officers of the Army, trained at the oral and plastic schools.

Besides the stereoscopic pictures, there are brief case reports with selected illustrations. Most of the pictures in the stereoscopic atlas have been made from the cadaver which allows of greater latitude in surgical expression, but, of course, somewhat limits proper perspective.

Plastic sugery of this region can follow no definite set rules so that the student must draw upon his imagination as well as his own originality to develop new ideas. Yet it is well to let the student see the excellent work that has been done by competent men and it is for this reason particularly that this set of pictures is to be commended.

Industrial Nursing. For Industrial, Public Health and Pupil Nurses, and for Employers of Labor. By Florence Swift Wright, R. N., Bureau of Child Hygiene, New Jersey State Department of Health; formerly Secretary of the Benefit Association of the Employees of John Wanamaker, New York; and formerly in charge of Industrial Nursing for both the Cheney Brothers' Silk Mills and the Clark Thread Company. Duodecimo; 179 pages. New York: The Macmillan Company, 1919.

The development of industrial medicine naturally carries with it a variety of new occupations. Among these, the industrial nurse is to play an even more valuable part than has been the practice in the past.

No single manual can present the numerous fields of effort requiring investigation, supervision, or control by industrial nurses, inasmuch as this new function requires training in nursing, social service, education, sanitation, as well as familiarity with the needs and hazards of various industries. The industrial nurse stands in peculiar relation to employee, employer, and the community, and her problems become intensified in proportion to her personal interest in the welfare of each of these three.

From the first-aid room to home visitation, with the completing of records and reports, serving in various ways in connection with the hiring and "firing" of workers, to the organization of industrial nursing centers, the management of day nurseries, the oversight of industrial lunch-rooms, canteens and recreation rooms, there is a vast opportunity for variety of functions in connection with a single job.

All of these phases of industrial nursing are considered with varying degrees of detail by Miss Wright, whose experience has been such as to give her a proper perspective for viewing the entire subject, together with a familiarity that comes from practice, in all the special factors entering into the life of the industrial nurse. There is much material compactly presented which should prove of immense value to those interested in advancing the health and welfare of those who toil in mills and factories, in mines and stores, in banks and tanneries, or serving elsewhere in the common work leading to industrial progress.

Electricity in Medicine. A Practical Exposition of the Methods and use of Electricity in the Treatment of Disease, Comprising Electrophysics, Apparatus, Electrophysiology and Electropathology, Electro-diagnosis and Electroprognosis, General Electrotherapeutics and Special Electrotherapeutics. George W. Jacoby, M.D., former President of the New York Neurological Society and of the American Neurological Association; Consulting Neurologist to the Lenox Hill Hospital, New York, etc., and J. Ralph Jacoby, A.B., M.D., Fellow of the New York Academy of Medicine, Member of the American Medical and the American Medico-Psychologial Associations; Chief of Clinic, Neurological Department, Lenox Hill Hospital. Small octavo; 612 pages; 262 illustrations. Philadelphia: P. Blakiston's Son & Co., 1919.

The title of this excellent work is thoroughly indicative of the scope of its subject matter. As the editors state in their preface, the original text, upon which the book is based, was written for a "System of Physiologic Therapeutics." The present volume serves to modernize the subject matter through the elimination of obsolete practices, and the description of developments and methods which have arisen since 1901.

The book is divided into six sections, dealing with electrophysics, the apparatus required for the therapeutic and diagnostic use of electricity, electrophysiology and electropathology, electrodiagnosis and electroprognosis, general electrotherapeutics and special electrotherapeutics. The large part that electricity plays in modern medicine is well described, and is presented with unusual clarity and directness. Through the excellent provision of illustrative material in abundance, there is a simplification of the text which reduces the difficulties encountered by some in the interpretation of abstract material.

Whether one be interested in the use of the sinusoidal current for the treatment of the lancinating pains of tabes, or desires to refresh his memory concerning the reactions of degeneration, or to familiarize himself with the theory of induction coils, there is a ready source of information in his thoroughly modern, well arranged, and interestingly presented volume.

The Practical Medicine Series. Comprising eight volumes on the year's progress in medicine and surgery. Under the general editorial charge of Charles L. Mix, A.M., M.D., Professor of Physical Diagnosis in the Northwestern University Medical School. *Volume II, General Surgery.* Edited by Albert J. Ochsner, M.D., F.R.M.S., LL.D., F.A.C.S., Major, M.R.C., U. S. Army; Surgeon-in-Chief, Augustana and St. Mary's of Nazareth Hospitals; Professor of Surgery in the Medical Department of the State University of Illinois. Series 1919. Duodecimo; 624 pages; illustrated. Chicago: The Year Book Publishers, 1919.

This volume is a critical abstract of the most important contributions to so much of the world's surgical literature in 1918 as was available for examination in this country. Most of the articles abstracted are from the publications in the Allied countries, since very few from Germany and Austria were obtainable.

The year was rich in the literature of war surgery and a digest of this material has been presented, without neglecting, however, equally important advances in civil—including industrial—surgery.

The articles are not only well selected and well arranged but are also abstracted with evident care and, many of them, with a reproduction of their illustrations.

Practical Medicine Series. *Volume I.* General Medicine. Edited by Frank Billings, M.S., M.D. Head of the Medicine Department and Dean of Rush Medical College, Chicago. *Series, 1919.* Chicago: The Year Book Publishers.

This review of important medical progress during the past year maintains the excellent standard of its predecessors.

Books Received

Anatomical Diagrams. For the Use of Art Students. Arranged with Analytical Notes and drawn out by James M. Dunlop, A.R.C.A., Antique and Life Class Master and Lecturer on Artistic Anatomy in the Glasgow School of Art. With introductory preface by John Cleland, M.D., LL.D., F.R.S., Professor of Anatomy in the University of Glasgow. *Fourth Edition.* Small octavo; 72 pages. New York: The MacMillan Company, 1919.

Vicious Circles in Disease. By Jamieson B. Hurry, M.A., M.D. (Cantab.). Author of "Poverty and Its Vicious Circles," etc. *Third Edition.* Octavo; 377 pages; with diagrams. Philadelphia: P. Blakiston's Son & Co., 1919.

What We Know About Cancer. A Handbook for the Medical Profession. Prepared by a Committee (Drs. R. B. Greenough, James Ewing and Jonathan M. Wainwright) of the *American Society for the Control of Cancer,* and published by that society (Bulletin 14) in co-operation with the Council of Health and Public Instruction of the *American Medical Association.* Paper-bound duodecimo brochure; 54 pages.

Les Lésions des Nerfs. Traitement et Restauration. Mme. Athanassio-Benisty, Ancien Interne des Hopitaux de Paris. Duodecimo; 156 pages; 66 illustrations; paper bound. Paris: Masson et Cie, 1919.

Anesthésie a la Stovaïne en Chirurgie et en Médecine Vétérinaire. Gustave Perol, Médecin-Vétérinaire, Officier du Mérite Agricole. Duodecimo; 31 pages; illustrated; paper bound. Paris: Masson et Cie, 1919.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by Hobart Amory Hare, M.D., Professor of Therapeutics, Materia Medica and Diagnosis in the Jefferson Medical College, Philadelphia. Assisted by Leighton F. Appleman, M.D., Instructor in Therapeutics, Jefferson Medical College, Philadelphia. *Volume XXII, No. 3.* 219 pages; illustrated. Philadelphia and New York: Lea & Febiger. 1919.

The Surgical Clinics of Chicago. Published bimonthly, *October,* 1919, *Volume* 3, *Number* 5. Octavo; pages, 1057-1315; 94 illustrations. Philadelphia and London: W. B. Saunders Co.

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RADIUM THERAPY.

Howard A. Kelly, M.D.,
and
William Neill, Jr., M.D.,
BALTIMORE, MD.

Two astonishing discoveries have been made within the past twenty-five years in the fields of diagnosis and therapy which the most gifted prophetic insight could never by any possibility have anticipated. How often one is asked, "What is to be the next great step in advance in medicine?" And yet who would dare hazard a surmise with the history of the discovery of the *x*-ray and of radium just back of us.

Moreover I am also sure that, had it been possible for some superhuman doctor sixty years ago to foresee each step of the marvelous progress which has resulted from Listerism, and from serum therapy, his explanations would have seemed like idle tales even to the most astute minds of his generation; they would have fallen on deaf ears and would soon have been forgotten as a foolish romance.

I do not have to go back further than the year 1880, when the class in the University of Pennsylvania, in which I started to study medicine was graduated, to recall my own obtuseness in the matter. Frank Hughes, of Newburn, N. C., was graduated with a thesis on the "Germ Theory of Disease," and I well recall my comment on the utter foolishness of his wasted effort in proving that germs and disease were akin or mutually dependent. He, however, was a prophet on the mountain tops while I was still blundering blindly in the mists of the valley.

And yet radium, that still inexplicable miracle, is actually here working its marvels every day and assuming its established place in medicine, as evidenced by the fact that clinics all over this country, and out of it, are buying their large supplies, and individual doctors are purchasing ten, fifty or one hundred milligrams. I have just received a large sum, to purchase and forward radium to a clinic in India!

My own work in this field began eleven and one-half years ago, and the first successful recurrent uterine cancer case in this country was, I believe, one of my patients, still living in Harrisburg, Pa., upon whom I had operated the previous year for cancer of the cervix. She returned to me for hemorrhages and with a recurrence at the right vaginal vault extending back in the pelvis toward the sacrum. I treated her for twenty-four hours for three successive weeks with a small aluminum tube of radium, and she recovered and has remained well ever since.

From that little beginning, and after the profession had wreaked its vengeance upon me as an innovator, and perhaps one suddenly gone daft, or a quack, the work has grown by leaps and bounds with the years, both in extending and testing radium out in new fields and in acquiring a better knowledge of its technique and methods of application, as well as in learning its serious dangers. In these numerous investigations, taxing all our energies in the fields of invention and application, I have worked continuously in close cooperation with Dr. Curtis F. Burnam; latterly we have the enthusiasm and valuable aid of Dr. Robert M. Lewis, Dr. William Neill, Jr., who cooperates with me in preparing this brief summary, Dr. Dudley A. Robnett, Dr. Joseph G. O'Brien, as well as the trained technical skill of Walter C. Lantsberry, managing the physical investigations, which includes measuring and standardizing the radium tubes, and making the solutions and the pumping of the emanation, or active radium gas, which is transferred to minute glass tubes preparatory to using it in treating the patients.

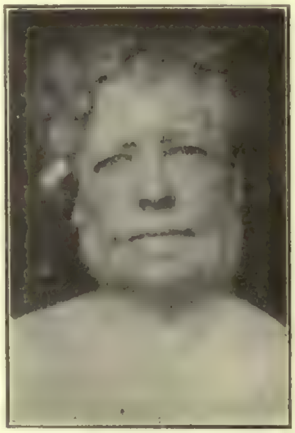
Since I began this work as just intimated, there has obviously taken place a remarkable change in the attitude of the medical profession with regard to radium treatments for malignant and other diseases, and we have no longer cause to complain of lack of cooperation. In but one particular might the profession be yet more actively with us, and that is in referring cases of Hodgkins disease, and of leukemias, and of the various blood dyscrasias associated with enlarged spleen, for prompt massive radiations in the early stages.

A word as to the methods of application about which there is some confusion of thought: In the first place pure metallic radium has never been seen in this country; one of its bulkier salts or its gaseous emanation is the effective agent always used.

If ten milligrams of radium is bought, what the purchaser really gets is ten milligrams of radium element in the form of the bromide or chloride or sulphate, in a platinum tube—just as though I wanted a grain of the metal sodium and bought the equivalent amount of sodium chloride or common salt instead. All radium purchases should be verified by the U. S. Bureau of Standards. Let me cite three instances as warnings. An English doctor bought some radium from a well-known French firm, and used it over a considerable period, until, satisfied he was not getting results, he determined to sell it, and took it to Sir Ernest Rutherford to be remeasured: Sir Ernest found that the tube for which he was hoping to get some two thousand dollars, did not contain the least particle of radium. This I had from Sir Ernest himself. I, myself, bought, about eight years ago, from the same firm, ten thousand dollars' worth of radium, but when it came to be measured up by Prof. Boltwood, of Yale University, the tubes were found to contain half the amount paid for. Fortunately I was able to compel the thieving firm to make good the loss. How many of their victims have never even suspected the impostors? This very week I had a tube purporting to contain one milligram of radium put into my hands, purchased by a poor man in the hope of benefiting his wife, who had an extensive recurrent cancer of the breast. It came from one of the best known and most reputable drug firms in this country, which had, I believe, bought and accepted it on the reputation of a French firm. When I compared the contents with a U. S. Government standardizing tube which we have, it was found to contain just about one-third of a milligram of radium, and worth at the maximum market price not over $33. A word to the wise is sufficient!

We are sure after a large experience that larger quantities of radium are usually more effective, and so use from one-half a gram to a gram and even much larger doses. In this way we can also treat cases that cannot be touched with lesser amounts. I often use the simile of putting out a fire: A little bit of water will only put out a little fire and is useless for a big raging fire; so a little radium will put out a small area of disease.

As to the method of application; if I want to apply a gram of radium, say inside the uterus, its very bulk in the form of radium salts is a hindrance, so for reasons of convenience as well as security against loss, it is better, when there is enough available to justify the expense of employing a technician, to dissolve all the radium salt in a weak acid solution in a closed glass receptacle; from this its active gaseous principle, called "emanation" by Rutherford is pumped off day by day, with a mercury pump and conveyed to a minute capillary glass tube, which is then sealed and cut off and then taken to the patient's bedside to be used. The greater convenience of this method of application will be seen when I state that all of the active material of a whole gram of radium in the form of a salt (which itself would fill a small teaspoon) can thus be accumulated in a tiny intensely active glass button not as large as the head of a common pin.



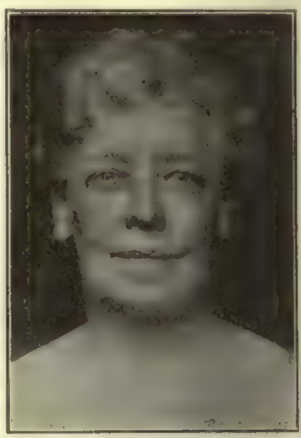
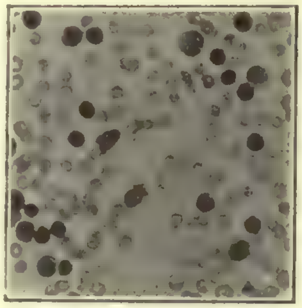


Fig. 1. No. 1897.—Patient 59 years old. First seen September 7, 1915. General glandular involvement, all superficial glands being affected, including spleen and mediastinal glands. Note masses in right and left neck.

Fig. 2. No. 1897.—This patient received three massive treatments with radium given over all glandular areas of the body, including abdomen, spleen and mediastinum. Following this there was a complete disappearance of the trouble. This picture was taken October 1, 1915. The patient remains well today and was seen a few weeks ago.



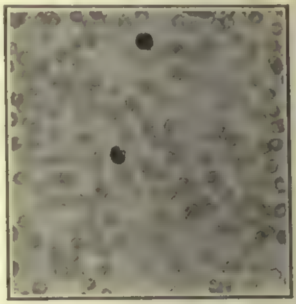


Fig. 3. No. 2194.—Patient 63 years of age. First seen October 3, 1915. Diagnosis: Myelogenous leukemia. W. B. C. numbered 717,600. General glandular enlargement, and spleen reached 3 finger breadths below costal margin. Note the extraordinary blood picture; the large cells, the myelocytes remarkably increased; the small dark cells, the lymphocytes also greatly increased. The pale cells are the red blood corpuscles.

Fig. 4. No. 2194. He received five treatments, the last one June 15, 1916. From 2 to 3 grams of radium used each treatment, covering his whole glandular system and especially the spleen. The white blood cells were 9,300, January 18, 1916. Note above the normal blood picture. This patient is still living but has a recurrence.

The difference between using the radium salt itself and using the emanation, its active secretion, is much like the delivery of cow's milk; in old times the cow was often taken from door to door and milked at each stand, in modern times the milking is done out in the country, where the cows are kept in a barn and the milk only is brought to town; the radium is the cow and the emanation is the milk.

Another use that can be made of the emanation, which is of extraordinary value, is by planting it in the tissues permanently in minute capillary glass tubes, each containing from two to three or five millecuries of the gas. A resistent affected gland will sometimes melt down with great rapidity when treated in this way.

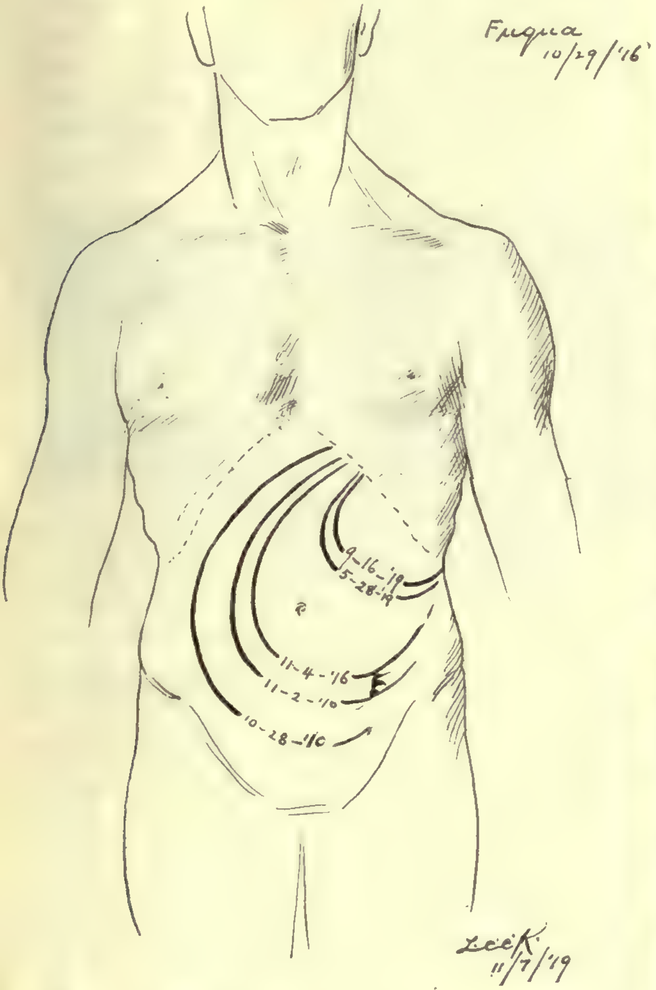
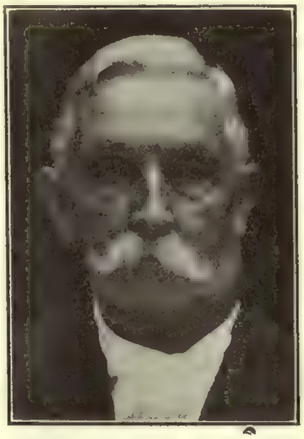


Fig. 5. No. 2888. Patient 39 years of age. First seen October 28, 1916. Diagnosis: Splenomyelogenous leukemia. Gigantic spleen, cachexia. W. B. C. 160,000. First treated October 29, 1916. Has been under observation ever since and has received many treatments. W. B. C. January 15, 1919, 9,500. Reductions of spleen noted on sketch! Has been symptomatically well since December 5, 1918. This is one of the most remarkable cases we have seen.

A most important factor in any successful treatment is the hearty cooperation of the patient. It almost invariably takes time, sometimes several weeks, often when duty and the heart strings are pulling strongly in the homeward direction. When a man's business seems liable to suffer from his absence, or when a woman feels uncertain about the care her children are receiving at home, it is often difficult to hold them in order to give the necessary treatments, distributed over a sufficient length of time. Still more difficult is it to persuade a certain number to return as a prophylactic measure when, as far as they themselves can see they are perfectly well. Perhaps the hardest of all are those who "must not upon any account be told that they have a cancer"; they see no reason for any sacrifice of time or inclination and are hard to persuade to remain for the necessary care. The most vexatious patients are those who have an incurable malady and have been for weeks or months under a physician's care and perhaps have had one



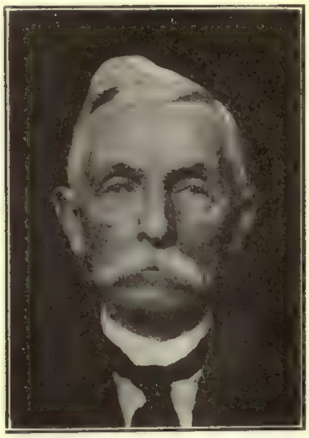
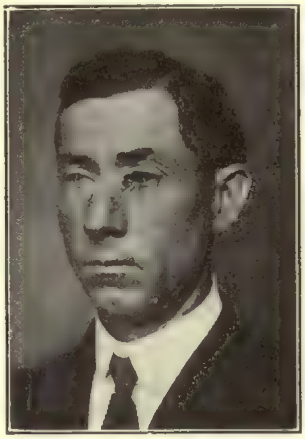


Fig. 6. No. 320.—Patient 71 years of age. First seen October 11, 1913, complaining of a lump in the left side of his neck. Diagnosis; Lymphosarcoma. He received one treatment of 734 mm. of radium for 24 hours. No other treatment. Photograph taken October 10, 1913. Note the large swollen mass of glands on the left side of neck.

Fig. 7. No. 320.—Photograph January 10, 1914. All trace of growth disappeared and there never has been any recurrence and he remains in good health.



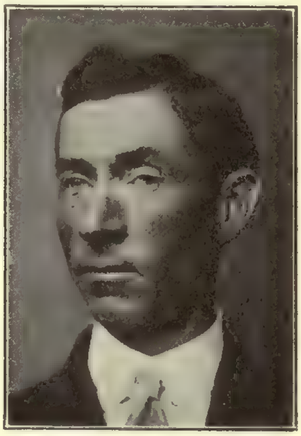


Fig. 8. No. 767.—Patient 30 years of age. First seen April 17, 1914, with an epithelioma of the inner canthus of the left eye, a common place for its occurrance and one impossible of operation without risking loss of eye.

Fig. 9. No. 767.—The result is shown after three treatments with radium. This photograph was taken Nov. 19, 1914. There has been no recurrence since.

or more operations, and yet expect to stop off and be cured with radium between trains.

The most brilliant successes of radium are scored in those fields in which a more aggressive surgical treatment is also usually successful, but where some serious complicating ailment such as heart disease, tuberculosis, Bright's disease or an extreme anemia, contraindicates anesthesia or any procedure which will tax the patient's vital resources. Here radium steps in and does its work quietly and even imperceptibly, and without the slightest risk to life. If it reached no other class at all, our whole outlay of time and expenditure would be more than justified by this group alone.

I purposely present here with some others, also some of our old cases, those which have been shown before, in order to demonstrate more effectively the permanency of the results. I shall show photographs of the following as illustrative cases; of the new field of radium therapy:

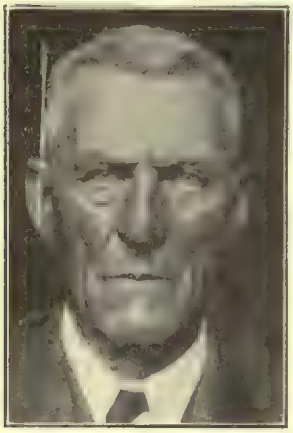


Fig. 10. No. 1699.—Patient 70 years of age. First seen June 4, 1915, with an epithelioma of the nose. Received four treatments, the last one December 18, 1916.

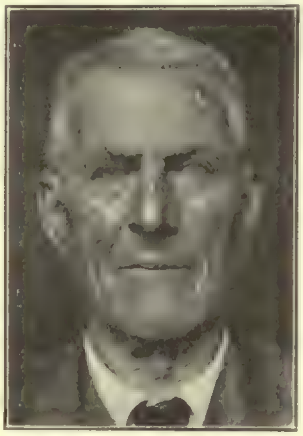


Fig. 11. No. 1699.—Result of treatment over eighteen months later. The growth disappeared promptly but the patient was kept under occasional observation.

1. Hodgkin's Disease—Figs. 1-2.
2. Myelogenous Leukemia—Figs. 3-4.
3. Splenomyelogenous Leukemia—Fig. 5.
4. Lymphosarcoma—Figs. 6-7.
5. Carcinoma of the Inner Canthus—Figs. 8-9.
6. Epithelioma of Nose—Figs. 10-11.
7. Cancer of the Thyroid—Figs. 12-13.
8. Epithelioma of Back of Head—Figs. 14-15.
9. Cancer of the Cervix in three stages—Figs. 16-17-18.
10. Fibroid Tumor Outlined on Gauze—Fig. 19.
11. Mediastinal Sarcoma—Figs. 20-21.

Radium-therapy is coming to be one of the most sharply defined specialties in medicine today. It demands study and experience and a skill in its handling in its various wide fields of application which is not quickly or easily acquired. Great and irreparable harm can be done by overzealous, too intensive and prolonged treatments, when even if the patient escapes serious injury, the tissues surrounding or overlying the part being treated may become so irritated that further treatment has to be suspended indefinitely and a golden chance of curing the disease may be lost. We often receive patients who have had prolonged, trifling, ineffectual applications, just enough to irritate the skin and make it impossible to go on with the use of radium without a long period of rest. The worst offenders are those who apply x-rays in a routine way until the skin is red and irritated. Here too much valuable time is lost waiting for the irritation to subside. To go on with the radiations under such circumstances means the production of a slough, without in any way helping the trouble. The spraying, prophylactic x-ray treatments so widely used are in our opinion useless.

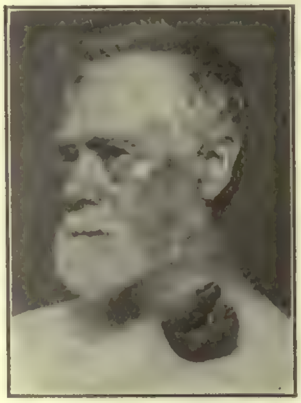


Fig. 12. No. 930.—Patient 73 years of age. First seen June 22, 1914. Diag.: Carcinoma of the thyroid.

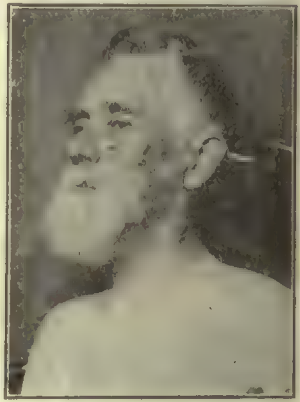
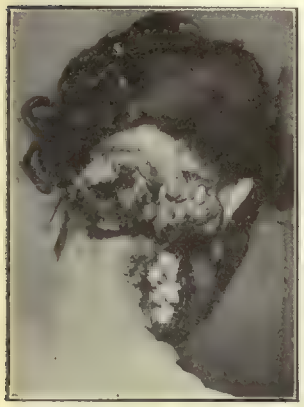


Fig. 13. No. 930.—He received one treatment 1911 mgs. of radium for 11 hours, which was followed by complete disappearance of the growth by August, 1914. No recurrence when last heard from in 1918.

The interesting, surprising and attractive part of our radium work is that it draws upon so many fields in medicine; we have no other successful treatment of *Hodgkin's disease,* (See Fig. 1 and 2), and here it has succeeded repeatedly, when the patients have been seen early. In ***lukemia*** (See Figs. 3 and 4) no other remedy is known, and here, too, radium often brings about a remarkable prolonged improvement and sometimes a cure. The various *enlarged spleens* (See Fig. 5) associated with blood dyscrasias are marvellously influenced by radium.

Is Lymphosarcoma (See Figs. 6 and 7) a medical or a surgical ailment? Perhaps the best answer is that it is neither, for neither physician nor surgeon can do the least thing to avert the fatal issue. Radium here often acts like magic. There is nothing so marvellous, so almost unbelievable, though you are watching the event, as the rapid melting down of a great lymphosarcomatous mass in the throat, which is choking the patient to death one day and a couple of days later is noticably reduced in size, and in a few days more is gone. I show one such case in the figures 6 and 7. Radium therapy draws upon the surgeon, or rather cooperates with the surgeon over pretty much his whole territory, in the field of new growths. It asks him, in the first place, to refrain in the future from futile operations in Hodgkin's cases and lymphosarcoma. It asks for all the superficial epitheliomata about the face where so many unsuccessful operations are done; especially does it concern itself with those in the neighborhood of the eye (See Figs. 8 and 9) and the nose (See Figs. 10 and 11) and the ear. Cancer of the lip, not too advanced, often yields, while as a rule the enlarged glands are best handled with radical surgery.



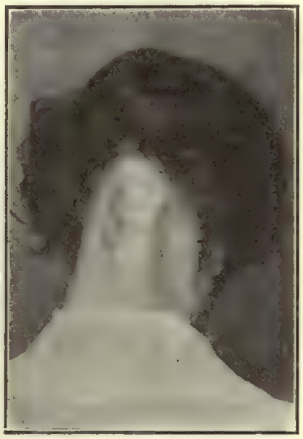


Fig. 14. No. 1365.—Patient 26 years of age. First seen December 19, 1914. Diagnosis: Basal celled carcinoma skin of neck.

Fig. 15. No. 1365—The growth receded rapidly after several treatments with radium and was entirely gone by October 30, 1915. There has been no recurrence and the patient has recently married.

On wet mucous surfaces, where the record of general surgery is bad in cancer, radium too meets its most serious difficulties; but the number of cases of cancer of the cheeks, gums and tongue (when seen early) which are being relieved, is *rapidly increasing with experience,* to our great gratification.

A mixed cancer of the thyroid (See Figs. 12 and 13) often does remarkably with radium where there is no hope with surgery; I show such a case in this figure.

Figures 14 and 15 by contrast, recall a most distressing case, indelibly impressed on my memory, from an experience early in my career, back in the eighties, when I was practising in Kensington, Philadelphia: a young woman, a mill worker from near Manayunk, about 19 years old, had just such a lesion and died a miserable death. This patient, on the contrary, owing to the progress made within one generation, is apparently cured and has married since her treatments about four years ago.

What hope is there in the use of radium in cancer of the breast? And what is the best course to pursue in any given case? The decision here involves a fundamental principle in radium-therapy as applied to cancer—namely, *it must be intensive,* it must be a direct application to a given, recognizable lesion, repeated at intervals. It is sufficient to simply spray a lymphosarcoma to dissipate it, but spraying will not do for any form of carcinoma, which must be handled with sledge-hammer blows delivered often repeatedly right on the affected spot. The difficulty in a cancer of the breast is this—in an advanced cancer it is manifestly impossible, antecedent to an operation, to know certainly in jnst how many foci the disease is distributed and the attempt to treat indeterminate areas of disease violates the principle enunciated, of repeated intensive treatments to each affected spot.

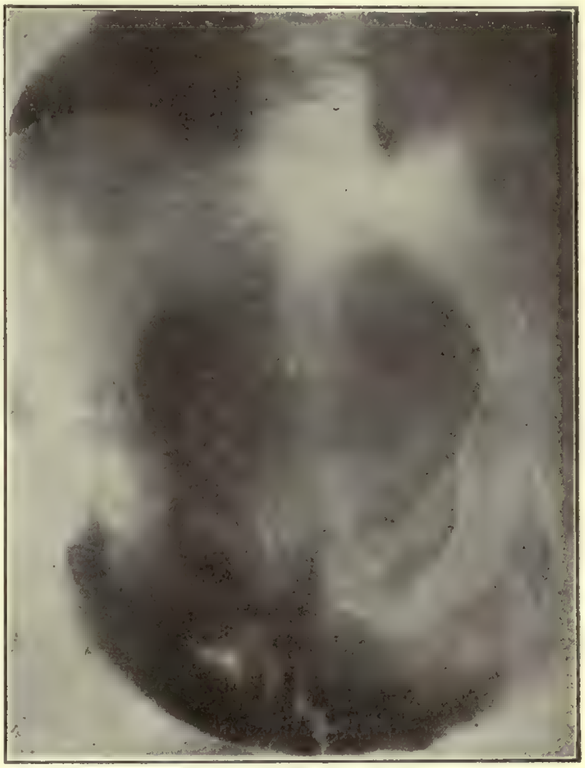


Fig. 16. No. 5015.—Roentgenogram of an enormous cancer of the cervix filling the vagina. This picture was made by mixing a stiff bismuth paste and spreading it all over the surface of the growth with the patient in the knee-breast posture, and then exposing to the *x*-ray. First treatment given April 19, 1919, which 1441 mgs. of radium for 2 hours and 40 minutes.

Let me here enunciate a paradox, which is this, that while all early cases of cancer of the breast are best treated by operation, on the other hand, utterly inoperable cases often improve remarkably under treatment. I have seen a breast where it was impossible to put the tip of the finger on a sound spot, melt right down and come to appear nearly normal. Unfortunately this does not take care of the metastases. We have adopted the rule in all our breast cases of taking roentgenogram of the chest before operating or radiating. In a large percentage unfortunately we find nodules in the lungs, which as a rule preclude further treatment. I believe that this precaution was first adopted by Dr. Burnam some years ago.

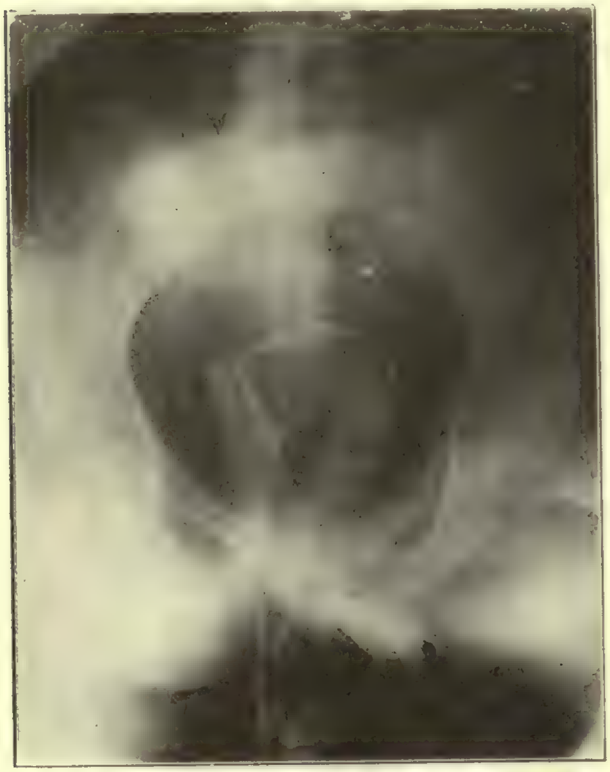


Fig. 17. No. 5015.—Roentgenogram of the same patient as in Fig. 16 on May 10, 1919. The fingers of the examiner have been smeared with bismuth paste and covered with a rubber glove and are seen in the vagina straddling and examining the tumor. The remarkable diminution in size is evident. The second treatment given May 10, 1919, with 961 mgs. radium for one hour.

Cancer of the neck of the uterus (See Figs. 16, 17 and 18) offers the therapist a remarkable opportunity, for the use of radium here bids fair in the near future to drive our surgery entirely out of the field. Let me sketch this matter historically, for it has run a curious gamut. When we first began using radium and found that the big cancers of the cervix, then treated with mesothorium, the equivalent of radium, melted down so remarkably under direct applications at the vaginal vault, a number of surgeons soon ran out before the world, waving their arms frantically like Archimedes of old and shouting, "Eureka! No more surgery; radium cures all these cases; the panacea for cancer is found at last." But the sad experience of many recurring cases began in a couple of years' time to dampen even the ardor of these neophytes, until at last a soberer judgment reigns. The present status of the case seems to be this: In early and very favorable operative cases, operation, preceded by thorough radiation, offers the best chance. Yet even here I am ready to concede that if the patient is near enough to the radium-therapist to be seen at intervals, and will conscientiously keep under observation, radium alone will probably do more than an operation, and without risk or mutilation. I venture to predict that within five years we are all of us likely to be using radium to the utter exclusion of operations; my dear friend, John Clark, already takes this stand. Now in all other cases except this group most favorable for surgery, that is to say in all in which any lateral fixation or infiltration of the parametria or broad ligament tissues can be felt by a careful rectal examination (made under anesthesia, if necessary) radium will do more for the patient than operation, for here recurrances are almost invariable. In some of these cases, as in masses of disease elsewhere, lingering nodules can often best be treated by the insertion of the minute capillary sealed glass points, each containing from three to five millecuries of emana-

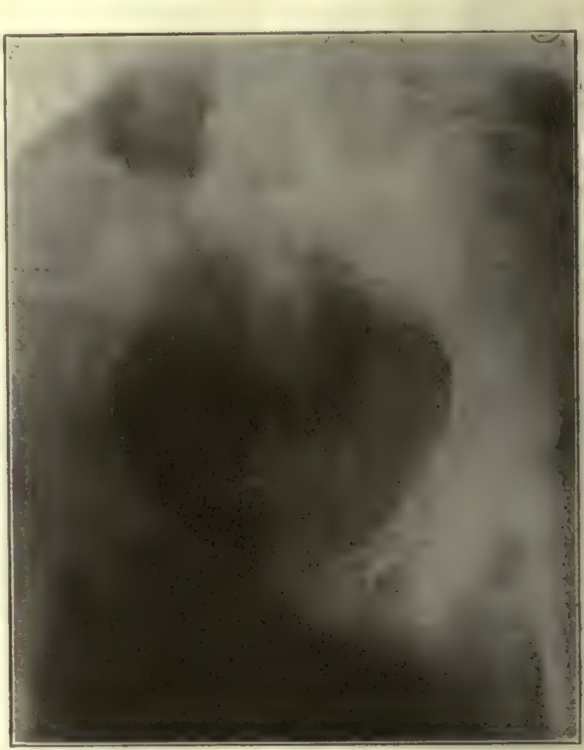


Fig. 18.—No. 5015—Three weeks later roentgenogram of the same case shows the cervix about normal in size. Patient received the following additional treatments, May 31, 1919, 274 mgs. 2 hours; June 21, 1919, 524 mgs. 30 minutes; August 2, 1919, 1460 mgs. 1 hour. Examined early in November I could find no disease, and removing a piece of tissue for microscopic examination this diagnosis was confirmed.

tion (the equivalent strength of the maximum yield of from three to five milligrams of radium) right into the tissues by means of a specially constructed hypodermatic needle. The points are buried and lie innocuous in the tissues, and the emanation sinks to zero in about five days. Such an apparatus has been designed by Dr. Robert M. Lewis to insert these points, or spicules.

A most precious and fruitful field for radium-therapy lies in the recurrent cancers at the vaginal vault. When these are seen early they can often be wiped out, never to recur. All of our uterin cancer patients ought to be examined at regular and fairly frequent intervals in order to detect a relapse at the earliest possible moment, when radium should be used at once. Here radium is supreme for there is but a small chance with surgery. Massive recurrences are often improved but rarely recover completely.

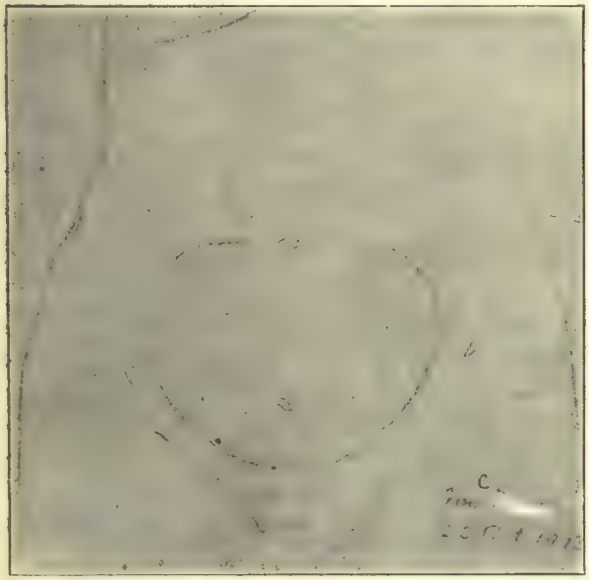


Fig. 19. No. 334.—Patient first seen October 20 1913. Diagnosis: Large myomatous uterus. This is shown as outlined on the abdomen and then transferred with pencil to crinoline laid directly on the abdomen. Treated with 100 mgs. for 24 hours. No further treatment. Complete amenorrhea which has persisted until now. No myomata could be found June 23, 1914. The uterus appears lightly enlarged and lies in the pelvis well behind the symphysis.

In "idiopathic," or so-called myopathic bleeding uteri, that is to say in all persistent uterine bleeding without gross demonstrable cause, about the time of the menopause, radium is the one supreme remedy. We used to curette these poor sufferers endlessly without benefit and then, as a last resort, shamefacedly proceeded, with apologies, to remove the uterus; but today, with a single application of radium, presto, all is changed and a cure is effected, without the risks and discomforts of an operation —not to be despised in the condition of extreme anemia often seen in this group.

One of radium's most wonderful fields is the treatment of fibroid uteri; here, perhaps in nineteen out of twenty, we can check the bleeding and stop the growth of the tumor, which shrinks more or less rapidly and sometimes disappears entirely. This, too, may be a matter of one or two brief courses of treatment, external as well as internal.

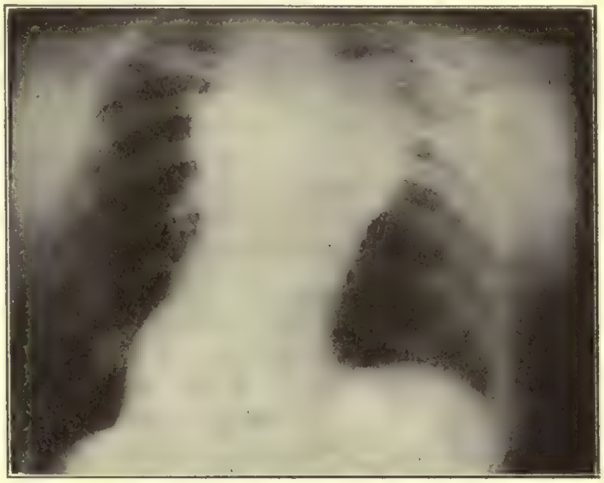


Fig. 20. No. 1965.—Patient 49 years of age. First seen October 11 1915. Diagnosis: Mediastinal sarcoma.

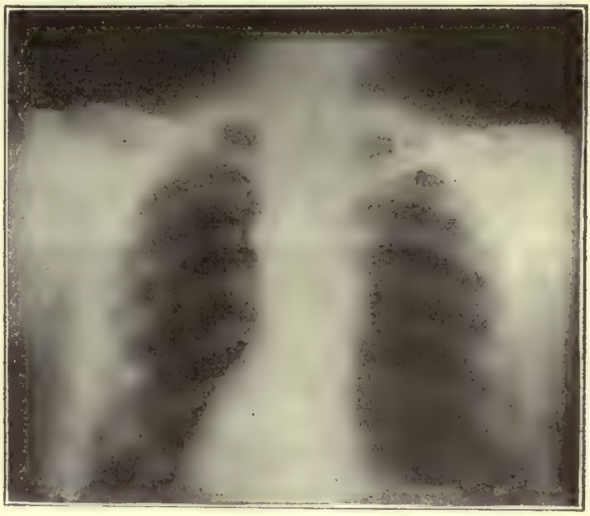


Fig. 21. No. 1965.—He received seven treatments with radium, using from 2 to 3 grams each time. The last treatment May 21, 1917. Note the remarkable disappearance of the tumors from the chest and with their going a progressive diminution of the most distressing sense of choking and dyspnea. There has been no recurrence and he appears well.

I give here a reduced picture (see Fig. 19) transcribed from our hospital records more graphic than verbal description. Let me remark that the size of the tumor does not seem to make much difference and that the treatment can often be given just as effectively through the abdominal walls as within the uterus itself. It is well to warn the patient that the first period may make its appearance and be very free, due doubtless to the increased hyperemia following the radiation.

Space fails me to cover even in outline this large field, but I must at least touch upon the marvellous results in a group of distressing sufferers whom, up to the days of more massive radium-therapy, we were compelled helplessly to watch die a lingering death from the gradual choking of the chest with sarcomatous (see Figs. 20 and 21), or with Hodgkin's enlarged intrathoracic, substernal glands. Dr. C. F. Burnam has written at length on this subject, giving our experiences (New Growths of the Mediastinum, *Jour. A. M. A.*, Sept. 22, 1917, Vol. LXIX, pp. 989-995, and The Treatment of Hodgkin's Disease, *Surg., Gyn. & Obstst.*, May, 1919, pp. 440-445).

Touching the palliative effects of radium, I often think that we fix our attention too exclusively upon the natural great desideratum of a complete cure in our cancer cases, forgetting the large and important group of those who are relieved over a long period of time, and restored to happiness and the joys of the family circle. It is true that it is a harrowing experience after six months or a year or two, to find that the disease has begun to return and that it is no longer amenable to our treatment, but let us not forget the great boon we have had in the amount of relief given. Then, too, let us not forget the considerable group in which hemorrhages have been completely checked and foul discharges eliminated, for which so many are most thankful.

Malignant diseases are especially the reproach of modern surgery, which only succeeds where the lesion is limited and is accessible. Radium comes to us in this distressing group as an adjuvant of enormous value, in some instances bringing entire relief where surgery is futile; in a few cases working effectively where surgery also works but less effectively; again radium coöperates with surgery over a large field. Let radium then be looked upon chiefly as a handmaid to surgery, honored in being summoned from time to time as a helpful coadjutor.

Let our last words be these, that in radium therapy as in surgical therapy, two things are of vital importance, first, that the earlier the case is seen the better are the chances of a permanent result; secondly, that every case ought to be followed up carefully at intervals of a few weeks or months, for years. I think he does the best work in this field who commands both resources and can resort with equal facility either to radium or to surgery or can employ both conjointly as seems best. Finally, with this new and astounding radium therapy just domiciled within our therapeutic household we can repeat the words of John Tyndall over a half century ago (1863), in his work on Heat as a Mode of Motion—"Even now we can discern, though but darkly, the greatness of the issues which connect themselves with the progress we have made—issues which were probably beyond the contemplation of those by whose industry and genius the foundations of our present knowledge were laid." No one will dare predict what lies beyond us in the path of therapeutic advance, but it is safe to assume that discoveries do lie before us no less greater than those which have bestrewed our way these last few decades. Let us then, like those intrepid mariners who first turned their faces westward and braved the unploughed wastes of the Atlantic, look with confidence out into the vast and troubled seas of the unknown, assured that the near future will bring unexpected and startling solutions to many of our most vexatious problems.

1418 Eutaw Place.

THE EXTRACTION OF INTRA-THORACIC PROJECTILES.

Doctor Petit de la Villeon,
Surgeon to Paris Hospitals.

Although there is a strong temptation to discuss at length the subject before us, I shall not yield to it, but shall present in as brief a form as possible, a few remarks which represent the sum and substance of numerous reports which I have heretofore published on this subject.

Our first duty is to pay homage to those who have paved the way for this later work, by their brilliant researches on the general method of operative extraction of foreign bodies under *x*-ray guidance, particularly Messrs. Wuillamoz, Civel and Mauclaire.

The method which I myself have evolved for the extraction of intra-thoracic projectiles under the fluoroscope by means of forceps, and particularly for intra-pulmonic foreign bodies, requires a technique the description of which I shall not here repeat. I shall recall to you only, that it consists essentially of the following: at the proper chest level a narrow button-hole incision is made through the skin only. A long blunt forceps is passed into this incision, pushed through the chest-wall and the pleura, then, penetrating into the lung, it is carried to the projectile, touches it, mobilizes it, grasps it, and extracts it. A suture closes the incision.

The operation lasts a few minutes, often not more than two or three, and as for the operative reactions, the surgeon is surprised by their extreme simplicity. The simplicity of immediate operative consequences, the perfection of remote operative results, the complete "restitutio ad integram," are the characteristics of this method.

Statistics.—In support of this technique I present my own statistics. I shall not mention the operations which I have performed since June 1915, by thoraco-pneumotomies according to old or new methods; neither shall I mention the statistics of surgeons who have followed my technique and operated by means of the forceps pushed into the lung, because I have only their incomplete statistics and I feel that they belong to their authors. I shall append, however, to my list, the extractions I have performed from the hilus, the pleura, and the diaphragm.

I have operated under these conditions, up to the present, upon 336 wounded men suffering from war projectiles embedded in the intra-thoracic organs. Amongst these cases, there are 333 cures and 3 deaths, which represents a total mortality of less than 1%—0.89% to be exact. These operations were as follows:

1. Intra-pulmonary projectiles, extracted through a button-hole incision, under the fluoroscope, at a depth varying from 1 to 13 cm. in the parenchyma 255–Deaths: 3
2. Projectiles in the hilum—hilum method .... 17 " 0
3. Projectiles in the pleura, extracts through a button-hole incision by means of forceps, under the fluoroscope .... 48 " 0
4. Projectiles in the diaphragm, various methods .... 16 " 0

Projectiles extracted from the lung, fluoroscopically have given me in 255 cases, 252 cures and 3 deaths. Twice death was due to the situation of the projectile near the hilus, and was caused by hemorrhage; since the subject succumbed to some immediate accident, whose nature I could not determine, perhaps due to anesthesia; but nevertheless, I shall attribute the death to the operative procedure.

The Surgical Principle.—The forceps extraction under the fluoroscope of intra-pulmonic projectiles, superficial or deep. is based on a principle, supported by research and by numerous reports, which can be formulated thus:

A blunt instrument, introduced slowly into the lung parenchyma, living and healthy, causes no damage, provided that it follows a single tract, and does not penetrate the region of the hilus.

This is the fundamental law on which the method is based, a physiological law never before formulated, and possibly disputed, but which I believe, may be accepted as true. On account of the elastic and resilient consistency of the living and healthy pulmonary parenchyma, the blood vessels and bronchial structures, which are not attached to anything, nor obstructed by anything, are turned aside by the blunt end of the instrument, and the forceps passes by them.

But, the objection has been offered, that it is necessary for the surgeon to go through a period of training in this method. This is true. I have always maintained, that no operator, however dexterous, should attempt to attack the lung before he has familiarized himself with the general technique of extraction under the fluoroscope, nor before he has extracted several dozen shell fragments from the extremities. But I might add, that after this short apprenticeship, the operation on the lung will be relatively simple.

Because a therapeutic method, which promises absolute relief to the patient, requires an apprenticeship, is no reason to condemn it. For example, should every child who had accidentally swallowed a coin be subjected to an external esophogotomy, because a remarkably simple instrument like that of Kirmisson requires that the surgeon learn how to use it?

The Region of the Hilus.—The method of forceps extraction under the fluoroscope, while serviceable for the lung, and at all depths, presents one contra-indication, (and I cannot repeat it too frequently): This is location in the hilus of the lung, and its immediate large ramifications, which has been termed "the hilus region." In a memoire read before the Société de Chirurgie by J. L. Faure, whom I never can thank sufficiently for his valuable encouragement and kindness, I added an attempt to define the surface and deep limits of this region. It appears less extensive than one might believe; and one might outline the danger zone, in which the forceps removal is contra-indicated, on the human subject, projected onto the posterior wall of the thorax as follows: *"A scapulo-vertebra trapezium limited internally by the spine, externally by the vertebra border of the scapula in its lower half, above by the fifth rib, below by the eighth rib."* Projectiles that throw their shadow in this trapezuim, and situated at a depth of from 6 to 14 centimeters beneath the posterior projection of the shadow, occupy the hilus region forbidden to the forceps.

Up to the present time surgeons have not dared to attack these projectiles in the hilus, but impelled by the dangers of foreign bodies in this location and the possibility of formidable hemorrhage which might result from them, operators have begun to take courage.

Le Fort and Pierre Duval have had good results with brilliant methods, and for projectiles in this region I myself advise "posterior radio-operative thoracopneumotomy."

The operation may be performed under strong red-orange light, under *x*-rays with the fluoroscopic screen, or by white daylight. Aided by resection of the posterior ribs, and by a total pneumothorax, I enter the hilus from behind forwards complete the extraction, and pack with a deep tampon. The tampon is removed after two or three days, according to the case, always with extreme gentleness. I have thus operated upon 17 such cases, with 17 cures, two of the cases developing empyema.

Objection has been made that pulmonary suture might perhaps be better than packing; the same objection had been made in reference to the other method of extraction by forceps under the fluroscope, that I sacrificed the benefit of pulmonary suture. My reply is that when operating in the region of the hilus as in other portions of the lung, there is, in my opinion, only one safe method of hemostasis for large bleeding vessels, when direct ligation cannot be performed, and that is deep packing. It must not be forgotten that in hemorrhage within the lung, there are two routes of egress for the blood: first, through the pulmonary opening, toward the pleura and chest wall, the exterior route; second, the interior route from the wound through the nearly always present communication with the bronchi trachea and mouth. These two routes are equally wide, and if a large vessel bleeds in a pulmonary wound, and direct ligature cannot be applied, suture of the pulmonary parenchyma affords only an illusory security. Only deep packing, by closing off both avenues of escape, can secure a rational and effective hemostasis. I am not unmindful, too, of the powerful aid to hemostasis which exists in these cases in the total pneumothorax.

Pleuro-Diaphragmatic Projectiles.—In pleural and diaphragmatic situations of projectiles surgery can accomplish the removal, without danger, if the surgeon is eclectic and varies his methods. Extraction with forceps under the fluoroscope through the button-hole incision is admirably adapted to all projectiles in the pleura, excepting only those in the mediastinal pleura. Here, if the surgeon decides to intervene, he should do so only with all resources available for major thoracotomy, according to the method of Delarine, Fontan, Pierre Duval, or le Fort.

At the level of the diaphragm, I have suggested that projectiles be divided into three groups, according to the region which they occupy.

1st group—Projectiles in the right diaphragm.

2nd group—Projectiles in the left diaphragm.

3d group—Projectiles in the median or mediastinal diaphragm.

For the first group, in the right diaphragm, preference should be given to forceps extraction under the fluoroscope; it is the least mutilating and the surest. The proximity of the dome of the liver offers no danger, and I often say "I operate on the liver as on a table."

For the second group, in the left diaphragm, the use of the forceps through a button-hole incision, is imprudent and dangerous, because of the proximity of the abdominal organs (greater curvature of the stomach, splenic flexure of the colon) to which the diaphragm may be adherent as the result of the original injury. These adhesions are very dangerous, and cannot be foreseen. In the situation of the left diaphragm, one must operate "under open skies," by the thoracic or abdominal route. I prefer the abdominal route.

For the third group projectiles lying in the median or mediasterial portion of the diaphragm, forceps extraction under the fluoroscope is definitely contra-indicated, and this method, so useful in other regions, would be blind folly here. By all means, use the open method, by the thoracic or abdominal route, and here too, I personally prefer the abdominal route, arriving at the central diaphragm from below.

Should All Intra-Thoracic Foreign Bodies be Operated Upon?—One must weigh the inherent danger of the foreign body left in place, and the inherent danger of the operation for its extraction. In other words, in cases which can be operated upon by the forceps under the fluoroscope, I believe that all projectiles should be removed. In cases that would necessitate thoracopneumotomy or abdominal approach, one must weigh carefully all the circumstances in order to decide whether to operate or not.

What is the Best Time to Operate?—The results obtained "à froid," that is to say on a cicatrized thorax, at least three weeks after the injury, are so good, that it might seem that this is the best time to operate. However, one must take into account those grave cases in which the primary hemorrhage forces the surgeon to perform early and wide thoracotomy as has been demonstrated by Pierre Duval.

On the other hand, the expectant method is sound, in large numbers of chest wounds, and excluding imperative conditions which force the surgeon to operate, the wiser method would be to limit the primary operation to the toilet of the chest wall, and of the frequently associated fractured rib, putting off to a later date the extraction of the foreign body, unless it is within immediate reach.

In conclusion, extraction of intra-thoracic foreign bodies has been improved considerably by perfection and simplification of the technique, particularly by the association of the *x*-ray in radio-operative methods.

CONGENITAL AND INFANTILE HERNIA ASSOCIATED WITH UNDESCENDED TESTICLE AND POTENTIAL HYDROCELE.

John F. Van Paing, M.D.,
CHICAGO.

There has been a great deal of discussion among surgeons as to just what constitutes a congenital or infantile hernia with its associated abnormalities, such as undescended testicle with or without infantile hydrocele. The literature upon the subject is not, in my opinion, at all comprehensive or explanatory. The cases which have come under my observation have been of definite anatomical types. Personally, I believe that all herniæ are congenital, but so long as the classical literature classifies them as "congenital and acquired," it does not become me to be dogmatic.

DEFINITION—INFANTILE HERNIA.

An infantile hernia is that type of hernia which shows anatomically a distinct obliteration of the funicular process at or near the internal ring, becoming patent external to the ring, and continuing so downward to open into the tunica vaginalis testis. A definite hernial sac is present in most cases, but it may be so thin and undeveloped as to make it impossible to identify it, owing to the associated hydrocele.

One of two conditions is possible:

1. The true hernial sac may become pushed downward behind the hydrocele sac, in which case it is usually very easy to identify and dissection is very simple.

2. It may become invaginated into the hydrocele sac, in which case they are intimately associated and adherent and consequently entail a great deal of patience in dissection.

CONGENITAL HERNIA.

1. A failure of the funicular process to close at the internal ring allowing free passage of fluid and abdominal contents into the cavity of the tunica vaginalis. In this type the patent funicular process forms a sac and is intimately adherent to the structures of the cord. This constitutes a true congenital hernia.

The varieties of cogenital hernia are:

1. Vaginal.
2. Funicular.

In the vaginal variety the sac is continuous with the tunica vaginalis, and the testicle is completely covered by the hernia. In the funicular variety the sac always lies above and is distinct from the tunica vaginalis and the testicle.

THE EMBRYOLOGIC DESCENT OF THE TESTICLE.

The embryologic "mesentery" or peritoneal fold called, in the male, the mesorchium, is more or less a suspensory ligament, diaphragmatic in its upper portion and inguinal below, called the inguinal ligament of the primitive kidney. The inguinal ligament contains between its folds connective tissue and unstriped muscle fibers. These become the gubernaculum testis in the male and the round ligament in the female. At the eighth month it enters the inguinal canal and normally just before birth leaves the inguinal canal and enters the scrotum. The arrest in its progress before it enters the inguinal canal causing it to remain within the abdomen should be designated "abnominal testicle" and the terms monorchism or cryptorchism should be applied to the condition when one or both testicles remain in the abdominal cavity. Developmental defects of the male sexual system embryologically may be the cause of the failure to descend. The secretory part of the testicle, which is derived from the metamorphosis of the indifferent sexual system, may be arrested or abnormal in development. The system of efferent ducts furnished by the Wolffian body may be arrested in development intra-abdominally. One or both of these factors would explain an arrest in descent or in development. The cremasteric muscle and fascia derived from the internal oblique muscle in the descent of the testicle are very thin and undeveloped, and the same is true of the infundibuliform fascia, resembling in some cases little more than a thin veil surrounding the cord. The testicle itself is small, atrophic, and usually hypersensitive. It is in most cases the seat of a partial or complete fibrosis. The spermatic cord is small and shows in some cases the adhesions of old inflammatory processes.

INFANTILE OR POTENTIAL HYDROCELE.

This is present in some degree, in all cases of infantile hernia, and is due to the same causes that operate to produce this type of hernia. The types are:

1. Diffuse hydrocele of the cord.
2. Encysted hydrocele of the cord.
3. Encysted hydrocele of the tunica vaginalis (rare).
4. Encysted hydrocele of the testes or epididymis.
5. Diffuse hydrocele of the cord and testicle.

ETIOLOGY.

1. Developmental defects.
    (a) Failure of the funicular processes to close.
    (b) Late descent of the gubernaculum testis.
    (c) Hereditary weakness of the abdominal wall.
2. Increased intra-abdominal pressure.
    (a) Large internal abdominal ring.
    (b) Relaxation of the lower abdominal wall.
    (c) In association with infantile hernia.

The encysted varieties of hydrocele, which are rarely seen except in infants coexisting with these herniæ may be due to—

1. Infantile hydrocele.
2. Inflamatory processes of the cord or testicle.
3. Traumatism at birth or an injury by a blow or undue pressure upon the scrotum or inguinal canal.
4. Patency of the funicular process at some portion of the cord, being closed at the internal ring and at the tunica vaginalis.

SYMPTOMS.

1. The condition usually is discovered in early adult life.

2. Impulse on coughing may or may not be present.

3. Acute strangulation with signs of obstruction may be the first symptom which calls the attention of the attending physician to the inguinal region in routine examination.

4. The presence of tumor in the groin, reducible or irreducible, should lead one to consider the possibility of congenital or infantile hernia.

5. The presence of fluid in or around the structures of the cord or testicle would suggest the possibility of coexisting hernia and hydrocele.

6. If inflammatory changes have occurred tenderness will be elicited on palpation.

7. The surgeon is usually consulted by the parents in regard to the absence of the testicle in the scrotum with perhaps a tumor in the groin.

8. Oftentimes attention is directed to the condition by the presence of a subacute orchitis of the retained testicle. This may last several days and be associated with slight fever and nausea. This probably is due to some slight traumatism or circulatory changes, as we know that retained testicles are very prone to repeated inflammations and progressive fibrosis.

DIFFERENTIAL DIAGNOSIS.

These combined pathological defects should be differentiated from:

1. Encysted hydrocele existing alone.
    (a) It presents a smooth globular outline.
    (b) It is freely movable in the canal.
    (c) If the testicle is present traction made upon it renders the canal tumor immobile.
    (d) The limitation of the upper end of the swelling is characteristic of hydrocele of the cord.
2. Inguinal adenopathy.
    (a) Usually adherent; impulse on coughing may be transmitted through the enlarged glands though it is not expansile.
    (b) The absence of opening at the internal ring.
    (c) Chronic abscess, which may be secondary to inflammations of the spine, abdominal wall or pelvis, and may point in the inguinal region. The impulse on coughing may also be present here but the indefinite outline would readily distinguish it from hernia.
3. Hematocele of the cord.
    (a) A history of injury.
    (b) Ecchymosis.
    (c) Absence of impulse on coughing.
    (d) Acute pain and perhaps nausea.
4. Undescended testicle.
    (a) Absence from scrotum.
    (b) The presence of a tumor in the canal may or may not be present.
    (c) If present the tumor gives testicular sensation upon pressure, or traction.
    (d) Irreducible.
5. Lymphoma.
    (a) This condition is very rare.
    (b) Large and smooth in outline.
    (c) May be rapid in growth.
6. Tumors of fat, etc.

These fatty tumors may be entirely disregarded, I believe they exist only in the literature.

7. Scrotal types of hernia.

These usually manifest themselves at puberty. They appear suddenly and may become complete at once after some sudden or violent muscular effort. This type may be followed immediately by acute strangulation of the contents and constitute what is known as "acute hernia."

8. Torsion of the spermatic cord.

A great deal of theoretical nonsense has been written about this condition. It is my opinion that torsion of the spermatic cord never occurs except in congenital or infantile hernia of the irreducible type, associated with undescended testicle. It is conceivable that this condition may occur where an undescended testicle lies at the external ring and is freely movable, but not otherwise. Several lengthy, tiresome papers have been written upon the subject of cord torsion, and extensive bibliography quoted, in an attempt to show its frequency. However, the fact remains that a normal testicle and cord imbedded in the dartos of the scrotum and in the inguinal canal does not twist upon itself without a pathologist basis in fact. In G. Frank Lydston's "Genito-Urinary Diseases," he says "up to 1901 there were but 32 cases of torsion of the spermatic cord collected from the literature."

RECURRENCE.

With careful dissection and care in closing the wound recurrences are rare as to the reproduction of the hernia *per se*. The undescended testicle presents the real problem. The number of operations originated by many different men for the relief of this condition is an admission that all of them are only partially successful. In the large complete hernia of these types associated with a small neuralgic testicle I believe unilateral castration with the radical cure of the hernia to be the best and most conservative procedure, especially in view of the fact that these testicles degenerate and ultimatly become sterile. If the testicle is situated at the external ring, is movable, and the cord is easily freed from the surrounding structures of the canal it is comparatively easy to deliver it into the scrotum, and the prognosis is much better than when it happens to lie within the canal or near the internal ring; if the latter is the case it of course would require an altogether different method of procedure.

OPERATION—CONGENITAL HERNIA WITH UNDESCENDED TESTICLE SITUATED AT THE EXTERNAL RING.

The usual hernia incision is made, extending well down over the pubic bone and perhaps one inch into the scrotum. The external oblique fascia is incised and reflected backward. Poupart's ligament is identified by blunt dissection and the conjoined tendon is freed from its underlying structures and the finger passed under it the length of the canal up to the internal ring. The spermatic cord is now freed by careful sharp dissection which should be made without undue tension being placed upon the cord. When the cord is freed up to the internal ring the infundibuliform fascia is completely divided in its entire circumference and separated from its investment of the cord at the internal ring. This I regard as very important inasmuch as it will often give an extra one-half to one inch extension on the cord when traction is made afterward. The identification of the sac is next accomplished by splitting the cremasteric fibers and by blunt dissection. In the vaginal variety the sac is continuous with the tunica vaginalis and the testicle is completely enveloped by the hernia. In the funicular variety the sac is above and is distinct from the tunica vaginalis and the testicle. In both instances, however, the sac is intimately adherent to the cord and requires careful sharp dissection to free it. In the former type the sac may be partially separted from the cord, divided above the testicle, reflected upon it or removed altogether. This step cures the vaginal hydrocele. The sac farther up may be dissected free from the cord or may be treated in the same manner as the part investing the tunica vaginalis. This I believe would be appropriate treatment when encysted hydrocele complicates the hernia. In the latter (funicular) variety where the sac lies above the tunica vaginalis and is distinct from it the identification, separation and removal of the sac is much more easily accomplished than in the former. The sac here may be freed with little difficulty and treated as in ordinary hernia.

UNDESCENDED TESTICLE.

Inasmuch as each case of undescended testicle presents a distinct surgical entity, the technique for its cure must of necessity involve widely different methods of procedure. As previously mentioned, the division of the infundibuliform facia as it invests the cord, when combined with sharp dissection and separation of the cord from surrounding structures in the canal, may produce sufficient relaxation to permit of its delivery into the scrotum without undue trauma or tension. In no case should a cord transplantation be done as this obviously would greatly change the contour of the canal, and consequently shorten the cord in proportion thereto. The Ferguson operation is the one of choice in this condition, in that it replaces the cord in the canal in essentially its former position, and permits of more cord relaxation. If there has been repeated inflammations in or around the cord the adhesions should be separated and contractions removed. If the testicle is situated within or near the internal ring, castration with removal of the cord up to the ring should be performed. This precludes the possibility of malignant degeneration of the testicle which is said to occur in rare instances, and it also prevents recurrence of the hernia by permitting the complete closure of the internal ring by suture. In some instances it is good surgery to penetrate the floor of the canal one inch below the internal ring and, by completely freeing the cord and testicle, passing it backwards through the internal ring into the abdomen and out again behind and below the epigastric vessels, this new opening to be made through the peritoneum and the triangular fascia of the posterior layer of the abdomen. The old ring may be completely closed adding another inch to the length of the cord by decreasing the length of the inguinal canal. Great care should be taken in this type of operation as the newly constructed ring may constrict the circulation and produce great edema or gangrene of the testicle. The operator should be very cautious in penetrating the canal in this location as the bladder may be present in the wound and may be injured thereby.

Attempt should be made to avoid the epigastric vessels as they cross the canal below and internal to the internal ring. Injury to the ilio-inguinal nerve in the canal and the ilio-hypogastric nerve as it enters the conjoined tendon of the internal oblique and transversalis muscle should be carefully guarded against. The roof of the canal may be closed as in other herniæ, the conjoined tendon sutured to Poupart's ligament without tension with interrupted catgut stitches, and the external oblique fascia closed by continuous suture. The testicle may be anchored to the lower end of the scrotum with catgut, though I believe this has no bearing on the end-result. French authors have advocated the crossing of the testicles in the scrotum through the median partition, but I believe this to be an error in technique as it only increases the tension upon the cord and the end-result is the same or even worse than in the older types of operation.

While stationed at an United States Army Hospital abroad I was fortunate in having assigned to me a large number of hernia operations and was deeply impressed with the large per cent. of Acute Hernias sent to the Base for operation. In these cases a well marked sac, adherent and containing a small amount of fluid, was to me an argument unanswerable that a large per cent. if not all herniæ are congenital or at least show a "prehernial" condition. This prehernial condition is the deciding factor in the etiology; it only requires a certain amount of sudden or violent muscular effort to produce a complete hernia with or without strangulation, the sac being present before with perhaps closure of the funicular process at the internal ring.

Any change in the structural anatomy of the inguinal canal or the anterior abdominal wall which will permit of a successful outcome in these cases is, in my opinion, highly desirable. I believe experimental work should continue along this line both upon the cadaver and selected operative cases, in an attempt to so change the canal structurally as to permit of a decided lengthening of the spermatic cord. The secret of a successful operation for undescended testicle depends upon the construction of a new internal ring. Additional work should be done on Hasselbach's triangle in this connection and in opening up the inguinal canal behind the external ring, simulating a direct hernia, with complete transplantation of the cord through a newly constructed internal ring. Operative results in cases of this type are absolute proof that it is a much desired improvement over the older methods and it is to be preferred where the testicle is to be retained.

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ABDOMINAL HERNIA IN CONJUNCTION WITH APPENDICITIS AND IN WOMEN WITH DISEASE OF THE PELVIC ORGANS.

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A report of 200 cases of abdominal hernia operated upon by the writer is in preparation. Approximately 60% of patients with right inguinal, femoral or umbilical hernia also suffer with disease of the appendix demanding its removal. Of women operated upon for hernia, over 80% also suffered with disease of the pelvic organs.

In December, 1918, I reported in the *New York Medical Journal* the results of operation upon 600 cases of appendicitis. In 4% of these, or 24 cases, abdominal hernia was operated upon at the same time that the appendix was removed.

This year I am about to report the results of operation for pelvic disease in 600 women. In approximately 3% of these abdominal hernia was also operated upon at the same time. These percentages are much lower than the actual incidence of the associated lesions. In the earlier cases many herniæ were overlooked.

In the interest of the patient and as a means of increasing the standard of efficiency on the part of surgical operations in curing all the disease with which a patient is suffering, these observations are of real significance. People are coming in increasing numbers to be operated upon. The education of soldiers concerning the need of cure of abdominal hernia, is leaking into the laity, putting truss fitters out of business and making it easy for doctors to urge people to be operated upon for this exceedingly common affection.

Reducible abdominal hernia, *per se,* unless complicated by inflammation or truss irritation, is not painful nor tender and causes few or no subjective symptoms. People who have hernia, however, when they have abdominal pain, not uncommonly attribute the pain to the hernia; and physicians and surgeons have shared this belief and advised that the hernia be operated upon for the cure of pain. Careful observation over a number of years and of a large number of cases has convinced me that when patients with reducible hernia complain of real pain in the abdomen, the pain will invariably be found to be dependent upon a lesion elsewhere, most commonly of the appendix and, in women, the pelvic organs. Infection and calculi of the urinary apparatus should also be borne in mind and the gall-bladder and stomach are commonly enough the seat of disease.

It is easy to understand why amateurs and occasional operators can be content to operate merely for hernia and fail to cure the affection of the appendix and pelvic organs at the same sitting. They are aware of their inability to do complete work and produce results of a high standard of efficiency and after gaining the patient's consent to permit them to operate, their next interest is to get the patient off the table alive. Moreover, it is not alogether incomprehensible why a certain type of commercial surgeon though skilful in his art, may reserve for a second operation and prolonged stay in the hospital, something to go back for; but we choose to believe that the real reason for the failure of a skilful surgeon to cure all the trouble at one sitting is due to his failure to recognize the frequency of the association.

The following brief case reports are illustrative as single examples of associated disease of the appendix and pelvic organs in about 80% of the right-sided and mid-line herniæ personally operated upon by the writer.

152340—Male, white, 25 years old, had known for two or three years that he had some swelling in the epigastric region. He has had repeated attacks of abdominal pain in several of which his doctor had seen him and informed him that his epigastric hernia was probably partially strangulated. A small fat-containing epigastric hernia just above the umbilicus and a long-standing badly diseased appendix, showing evidence of a recent attack, were revealed.

The appendix was removed and the hernia repaired. There was no evidence that any omentum or bowel had ever been in this hernia to have caused the abdominal pain. The appendix was the sole cause and a re-study of the clinical history was typical of recurrent appendicitis.

193118—Female, white, eight years old, was sent in for operation of umbilical hernia which she had had since birth. For the past two years she has suffered recurrent attacks of colic with vomiting. The hernia was at no time irreducible nor tender. At operation there was found a simple, uncomplicated umbilical hernia, of moderate size, containing no bowel or omentum, and showing no adhesions. The appendix was greatly thickened, strictured in three places and contained three enteroliths varying in size from a green pea to a grain of corn. The appendix was removed; the hernia repaired. A look at this case was quite convincing that the hernia was not the cause of the pain. The appendix was badly diseased.

193122—Male, white, 35 years old, was sent in for operation for right inguinal hernia which he had had for many years. He stated that his hernia had never caused him any pain, and he was to be operated upon for the hernia *per se*. Careful inquiry into the man's history elicited that when he was a boy he had a good many attacks of colic. He has not had any severe pain for several years but he has persistent "indigestion," at times severe, necessitating his being careful about the quantity and quality of his food. Each attack of indigestion was attributable by him to food indiscretion and while each attack was accompanied by moderate abdominal pain, his chief complaint was "dyspepsia." I told the man I believed he had chronic disease of the appendix. He felt so sure that he did not, that he requested me to respect his sentimental objections to removal of the appendix. I informed him that I would respect his wishes provided the appendix was not diseased, but I should insist upon examining it and if it was diseased, I should insist upon removing it. To this he agreed. Upon performing the operation according to the technic which I have been employing for several years (and which will soon be published in *Surgery, Gynecology and Obstetrics*), the appendix was found to be partially destroyed by previous disease and densely bound to the cecum and post-cecal structures by firm adhesions. It required 15 minutes of tedious dissection for its removal. The hernia was then repaired.

A review of this man's clinical history was typical of long-standing disease of the appendix and the lesion of and about the appendix was a serious menace to the man's life.

193089—Male, white, 25 years old, was referred for operation for femoral hernia upon which he had worn a truss for a good many years with great dissatisfaction, tenderness about the hernia and traumatism caused by the truss. He said he had had repeated attacks of abdominal pain, with nausea and vomiting, which had been attributed to the hernia. At operation, however, an incision made above the inguinal canal into the peritoneal cavity above the neck of the hernia, (technic soon to be published) the appendix was found to be badly diseased and adherent requiring tedious dissection for its removal.

This man's pain and indigestion were solely attributable to the disease of the appendix. The hernia contained neither bowel nor omentum and there was no evidence that it had ever been strangulated.

193159—Female, white, 35 years old, had had femoral hernia since childhood for which she has worn a truss unsuccessfully and has had a good many attacks of partial strangulation and irreducibility. The last of these was two days before operation and caused her and her physician great alarm because of tenderness and irreducibility of the hernia, violent abdominal pain and vomiting. After a somewhat prolonged effort on the part of the patient, in the recumbent position, she succeeded in reducing most of the contents of the hernia and this was followed by cessation of the pain and vomiting.

Operation performed through an incision above the inguinal canal into the peritoneal cavity and above the neck of the hernia revealed a large mass of omentum firmly adherent and deep in the sac requiring tedious dissection for its removal and excision. The parietal peritoneum in the neighborhood of the hernia was also adherent to omentum and it was with considerable difficulty that the hernia was finally enucleated from its bed, inverted into the incision and excised, according to the method of procedure soon to be published. Palpation of the pelvic organs, through the incision, discovered a thin-walled right ovarian cyst about the size of an orange. While holding the cyst, preliminary to its removal, it ruptured. The cyst pedicle was sutured, the hernia enucleated and removed, the peritoneal incision and inguinal canal closed.

A review of the clinical history of this case revealed repeated attacks of pelvic pain and dysmenorrhea and it is not at all unlikely that some of the previous attacks of pain may have been due to this cause though the omentum was densely adherent to the hernia and there was clinical evidence that the hernia had been truly strangulated. An ovarian cyst of this size, however, is commonly conceded to be productive of symptoms and should have been removed independently of the existence of a hernia. It would not have been, however, if we had not looked for it.

The above five cases are picked at random from a large number of similar case records in my series of 200 operations for hernia.

Conclusions.

About 60% of all patients who come to operation for abdominal hernia also have appendicitis.

About 80% of women with hernia also have disease of the pelvic organs.

Appendicitis needs operation, pelvic organ disease calls for operation and all cases of hernia of less than colossal size should be operated upon unless, on account of extreme old age, severe cardiac or bronchial asthma or uncontrollable insanity, it is unwise or impossible to keep the patient recumbent a few days.

Patients with hernia who complain of pain in the absence of strangulation and inflammation are almost certain to have an affection in some other organ. Pain is not caused by uncomplicated hernia.

Every patient operated upon for umbilical, incisional or right-sided inguinal or femoral hernia should have the appendix removed at the same operation through the same incision.

Women with abdominal hernia should be thoroughly examined for disease of the pelvic organs. Associated lesions will be found in a large number of these cases. All that is pathological ought to be cured at the same operation through the same skin incision and when the pelvic disease is confined to the tube and ovary of one side, these may easily be removed through the incision employed by the writer in dealing with all types of inguinal and femoral hernia.

THE GERMICIDAL PROPERTIES OF SOME OF THE COMMONER VOLATILE LIQUIDS.*

Data obtained in the course of experiments with suture "tubing" fluids.

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Chloroform has been used for a number of years as a sterilizing and preserving medium—or, as it is designated among manufacturers, a "tubing" fluid—for catgut sutures put up in flame-sealed glass tubes and prepared and sold as sterile catgut.

We have examined into the qualifications of this and several other fluids in the course of an investigation as to their respective characteristics for this purpose. In the course of this research, we discovered several interesting and, we believe, valuable facts. These, as far as we are aware, are not to be found in the literature of medicine, chemistry, physics or bacteriology.

All of these related sciences are concerned in this work by reason of the fact that the conditions existing in a sealed glass tube are unique. This in the sense that, when such tubes are treated with steam after sealing, we have to consider the germicidal action of fluids at temperatures above their boiling points. We have been unable to find in relative literature any reference to the germicidal power of any fluid—with the single exception of water—under these conditions.

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*From the Research Laboratories of Johnson and Johnson.

The history of the use of chloroform as a catgut suture preservative or sterilizing medium probably dates back to Dr. Charles Rice, of New York City, whose name appears in the United States Pharmacopoeia of 1890 as Chairman of the Committee of Revision and Publication.

In his work at Bellevue Hospital Dr. Rice used chloroform containing mercuric iodide (the red iodide) in solution. This was a preserving fluid of high germicidal character. It was used to maintain a sterile and, at the same time, antiseptic condition in catgut, after a preliminary sterilization in other fluids. The solution was not heated[1].

The early use of chloroform by suture manufacturers as a tubing fluid for catgut was, apparently, a development of the Rice methods. The production of sterile catgut by processes involving the use of chloroform appears to have been largely empirical, for no knowledge seems to have been available as to any special reason for using chloroform. This, perhaps, because it was not known to have any specially high germicidal properties. Obviously, however, it did qualify for the purpose in the particular that it could be obtained, without difficulty, in a practically water-free condition. This was not true of alcohol, the fluid commonly used for catgut sterilization at that period. It is necessary that such fluid be anhydrous if it be the intention to sterilize catgut in it by heat above the boiling point of the fluid. Chloroform is also sufficiently volatile to evaporate quickly from the catgut strand upon its removal from the tube by the surgeon or nurse for use in the operation. At the same time, it is not so highly volatile as to cause sealed glass tubes of sound construction to explode when heated by steam much above its boiling point, which is about 60° C. Further than this, it was early demonstrated that chloroform, certainly in such quantity as that carried over by a catgut suture, does not irritate the wound, nor does it produce any toxic symptoms.

Chloroform is quite widely and successfully used as a preservative for aqueous fluids such as urine, glandular extracts, etc., and, since its solubility in water is only about one-half of one per cent., it is obvious that it must possess decided antiseptic properties and that, under these conditions, such properties are well-known and recognized.

The one and only clear reference to the germicidal properties of chloroform itself—that is, chloroform used alone—which we have been able to find is the statement in Sternberg's "Bacteriology" quoting Koch to the effect that "immersion for one hundred days in chloroform does not destroy the vitality of anthrax spores."[2] Special attention is here directed to the well-known fact that Koch's favorite method of testing the power of germicides at that period (about 1880) was by means of silk threads dipped in a culture of the organism. Reference to this will be made later on.

In our work in checking and controlling the various sterilization processes used in the laboratories with which we are associated, it is our practice to use a piece of material of convenient size for bacteriological manipulation and infected with organisms which represent maximum resistance. This we accomplish by means of a quarter-inch wide cotton tape that has been thoroughly extracted with hot water for the purpose of removing any possible sizing, and then immersed in a water suspension of spores of bacillus subtilis scraped from the surface of nutrient agar. This tape, in long lengths, is then hung in the laboratory for several days to dry and to collect any and all miscellaneous organisms that fall upon it. This latter procedure is followed in deference to the somewhat common belief that "wild" spores may be more resistant than the cultured variety. The validity of this belief seems to us to be open to dispute; but to avoid having our results questioned on that score, we regularly adopt this method.

The tape in question is cut into lengths of about one and one-quarter inch and kept for testing. To determine the lethal resistance of these tapes, we immerse them in water actively boiling over a free flame. We remove one of these tapes in one minute, a second in two minutes and a third in three minutes, etc., immediately transferring them to culture tubes of broth. Our usual experience is to get a growth from the one-minute tapes and none from the two- and three-minute tapes.

To sterilize catgut by any heat method necessitates to all intents and purposes complete removal of moisture from the gut previous to the application of the heating process; otherwise, it is shrivelled and ruined. In order, therefore, to stimulate this condition with our test-tapes, we dry them in an oven at 100° C, for one hour. They are then transferred to glass ligature tubes of the usual size (about one-quarter inch by four inches), covered promptly with chloroform, or other fluid under investigation, and flame-sealed. Note that then we have a condition not commonly met with in bacteriological work, viz., water-free spores in a water-free liquid.

After these tubes have been submitted to the treatment indicated they are scratched with a file and that part of the tube flame-sterilized. The tube is then broken open, the tape being removed with flame-sterilized forceps in the usual bacteriological manner and placed in a culture tube of sterile broth. For this purpose, we follow our usual technic in testing ligatures, making ten cultures for every experiment and using large test tubes, each of which contains about seventy-five cubic centimeters of broth. We use this unusually large amount of broth for the purpose of securing a high dilution of the liquid carried over by the ligature or tape, thereby avoiding its possible inhibitory action upon the culture.

The following tabulations show the results which we secured in this work:

TABLE A.

Showing the killing power of several liquids at different temperatures, using spores of Bacillus subtilis from *water* suspension on *cotton* tapes.

Temperature and Time	Chloroform.	Ethyl Alcohol 99%	Ethyl Alcohol 95%	Methyl Alcohol 99%	Amyl Alcohol	Benzol	Toluol
25° C. (room temp.) for 24 hours.	10 tests 4 growths						
25° C. (room temp.) for 7 days.	10 tests No growths.						
25° C. (room temp.) for 21 days	10 tests No growths						
75° C. (in water) for ½ hour.	10 tests No growths						
100° C. (boiling water) for ½ hour.	10 tests No growths	10 tests 10 growths	10 tests No growths	10 tests No growths	10 tests No growths	10 tests 10 growths	10 tests 10 growths
120° C. (15 lbs. steam) for ½ hour.		10 tests 1 growth	10 tests No growth	10 tests No growths	10 tests No growths	10 tests 8 growths	

TABLE B.

Showing the killing power of *chloroform* at the boiling point of water, using spores of bacillus subtilis from *broth* cultures on *cotton* tapes.

100° C. (boiling water) for ½ hour.	10 tests 10 growths

TABLE C.

Showing the killing power of *chloroform* at several temperatures, using spores of bacillus subtilis from *water* suspension on *silk* tapes.

25° C. (room temp.) for 24 hours.	9 tests 9 growths
75° C (in water) for ½ hour.	10 tests 10 growths
100° C (boiling water) for ½ hour.	9 tests 9 growths

TABLE D.

Summary of those parts of tables A, B and C, showing results with *chloroform* at several temperatures, using test spores of bacillus subtilis from *water* suspension and from *broth* culture on both *cotton* and *silk* tapes.

	Water Suspension on Cotton	Water Suspension on Silk	Broth Culture on Cotton
25° C. (room temp.) for 24 hours.	10 tests 4 growths	9 tests 9 growths	
75° C. (in water) for ½ hour.	10 tests No growths	10 tests 10 growths	
100° C (boiling water) for ½ hour.	10 tests No growths	9 tests 9 growths	10 tests 10 growths

These tables exhibit three points of definite interest. It has been shown (1) that broth dried on cotton tapes protects the bacteria it contains from the action of chloroform; (2) that when that protection is absent (substituting bacteria from an agar surface and suspended in water), chloroform is found to be a germicide of power never before recognized; (3) that silk also has a protective or encapsulating character which renders it unfit for use as a medium for carrying bacteria for test purposes of this kind.

The tissue of which surgical catgut is made (sheep intestine) has this encapsulating property, as is generally known, and it always contains spores in that state. The many difficulties in the preparation of sterile surgical catgut sutures, are concentrated chiefly in the effort to overcome this condition without harm to the gut itself. Obviously, if chloroform or other "tubing" fluid will not penetrate the encapsulated spores, it is necessary to apply to the gut a thorough sterilization, preferably by direct dry heat, before the catgut is stored in the "tubing" fluid.

When this procedure is followed and the encapsulated spores are killed, the germicidal action of the chloroform, or other "tubing" fluid, is readily exercised upon the superficial bacteria, whether vegetative or spores, by which the gut may have become infected by handling, or from exposure after the preliminary heat-sterilization to which we have referred.

To us, the most striking feature presented is the complete protection afforded bacteria by the encapsulating action of the broth fluids when dried upon tapes. This protective coating, in all probability is the reason for Koch's report that chloroform is practically without effect upon anthrax spores. It is quite likely that he used broth cultures in his testing work, and it is almost certain that he used silk threads or tapes. It is plain that either of these factors would disqualify his results.

Referring to the killing power of chloroform on bacteria, it will be noted that it is far more effective than absolute alcohol.

The almost complete lack of germicidal properties of benzol and toluol under these conditions is, perhaps, worthy of note.

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[1] Hospital Formulary Department of Public Charities, etc., of the City of New York.

[2] Manual of Bacteriology, Geo. M. Sternberg, M.D., 1893 edition, page 169.

THE IMPORTANCE OF THE PREPARATION OF THE AUTOGENOUS BONE GRAFT AND ITS APPLICATION TO ITS NEW ENVIRONMENTS.*

Dr. Charles Geiger, M.D.,

ST. LOUIS, MO.

One of the essential points in making a bone transplant is selecting the most potent location from which to remove the graft. While the transplantation of homogenous material—i. e., derived from a subject of the same species—may be useful in a limited number of cases, as a mechanical support, it is not all a matter of repairing the defect, but of supplying the proper means which will favor the reproduction of tissue to fill in, or correct, the defect. This is a well known fact, to those who do osteoplastic work. *We cannot repair a defect in bone,* but we can resort to procedures which will stimulate the regeneration of bone already present or remaining, thereby filling in the defect by the reproduction of tissue.

In order to be successful in this branch of surgery, a man must have a complete knowledge and a clear conception of embryology, histology, anatomy of bones and joints, as well as the form or type of regeneration, not only of the bone, but also of the soft tissues. No matter how this work is done, or upon what theory it is based, it must be carried out along definite lines, as closely as possible. It may be said with positiveness that the question of what sort of material, and from what source it should be taken, has been solved.

Not only has it been clearly demonstrated that the autogenous transplant is the only one to be used, but also that it should be taken from as near the location of transplantation as is possible.

Owing to the different histological formation of the various bones of the body: greater or less density, difference in circulation and nerve supply, and their greater or less distance from the center of circulation, which cause the environment not to be the same in all the bones of the body, it has been proven that if a transplant is taken from the same bone as that into which it is to be transplanted, the percentage of good results is greater than if the graft is taken from a distant part of the body. This would teach us, then, that environment has a marked influence on the results obtained in plastic bone surgery.

I have devised a plan by which the graft is taken from one of the fragments of the fractured bone: in place of lifting it out of its original bed, it is pushed into the marrow of the bone, and slipped up or down, whichever the case may be, dividing the transplant equally between the fragment-ends of the bone. The fractured ends of the bone are previously prepared, however, so as to permit passing the transplant into its future position, as above described.

Taken for granted that the tibia furnishes the ideal material for a transplant, on account of its firmness of structure, scanty blood supply, and superficial location, it would not be received as kindly if transplanted into the humerus, as if the transplant were removed from some portion of the shaft of the humerus, if that were practical. Therefore, the transplant should be removed, in all cases, from as near the location of its future bed, as is practical.

It is to be emphasized that a special technique should be employed in bone surgery. Rigid operative asepsis is to be maintained. Great care must be taken not to wound or lacerate the tissues any more than is absolutely necessary. The vitality of the transplant depends largely upon the care in removing it and retaining it in as nearly a normal condition as possible. The native blood and serum should be kept on the surface, as well as within the graft itself, consequently the change from the old to the new location, should be made quickly, so that nature's life fluid will be conserved and not dessicated or drained away. Should there be a temporary delay between the removal of the transplant, and the placing of it in its new bed, it must not be placed, or any attempt be made to preserve it in saline, or any other solution, because they remove that which should be retained: the fluids of its life (blood and serum), which sustain the vitality of the transplant.

In case of delay, the graft should be wrapped in a damp, sterile oil silk, to exclude the air, and retain the moisture; water or other liquid should never be applied to a wound in order to keep a motor saw, or any other cutter, from burning the bone or for cleansing purposes, for it invites infection, and removes the vital substance we wish to retain; in fact it always does more harm than good.

In controlling hemorrhage in plastic bone work, the tourniquet is contraindicated, because of the danger of reactionary hemorrhage following, with clots in the deeper part of the wound, which would interfere with the vascularization of the transplant. To control the hemorrhage from small vessels and capillaries of the soft part and bone, the wound is packed with gauze, thoroughly wrung out of hot normal salt solution; arteries and veins of any size, are picked up with hemostats, and tied with absorbable ligatures. Great care must be exercised to see that all bleeding is controlled. Many operators have failed to obtain the desired results because of the lack of proper attention to the complete stopping of the hemorrhage in the bone, as well as in the soft parts. With hemostasis complete, the transplant may be placed in its new position.

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*Read by title at the twenty-ninth annual session of the New York and New England Association of Railway Surgeons, in New York City, October 20, 1919.

The success of the transplantation also depends largely upon the actual contact between the osteogenetic surface of the host, and the osteogenetic surface of the transplant. Too much cannot be said in regard to the injury of the superficial cells of the bone-graft, or to the contacting surface of the host. Great caution should be exercised in preventing frictional overheating of the sawed surface, by the speed of the electric saw: also from contacting the graft to its host so tightly as to produce superficial necrosis. Also to be emphasized is the importance of bearing in mind that the antiseptics sometimes used, if brought in contact with the surface-cells of the bone graft, or its host, may do irreparable injury by destroying the cells of such surface; by the time the injured cells have degenerated, become absorbed, and cleared away, the underlayer of living bone of the host, and the graft, will have healed over, and will fail to unite or to graft over such surface.

The essential elements of a transplant are found in cortical bone, because of: its resistance to change of form, by which it gives support to its host; its small vascular supply which allows it to retain its vitality for a considerable length of time after transplantation; its capabilities of being sustained by a small amount of nutrition; and its active osteogenetic properties—all of which cause it to graft with rapidity and firmness.

The early vascularization of the transplant is materially aided when it is possible to leave the periosteum and endosteum intact. It has been forcibly demonstrated that small fragments of bone retain their vitality, and graft better and more readily, than larger pieces. The transplant, then, should be composed of the smallest amount of bone that will fulfil all the requirements.

The periosteum must be removed from intramedullary dowels, bone pegs, etc., where they have bony contact, or where they extend up into the ends of fractured bones. If the ends of the fractured bones come together, the entire graft should be denuded of periosteum or endosteum. If, however, considerable space exists between the ends of the fractured bone, that part of the transplant not covered by the recipient bone, should possess all the periosteum or endosteum possible. With this before us we can readily understand why the fibula makes such an excellent transplant in certain cases.

It is always advisable to use a quadrangular-shaped graft, especially so if it is an intramedullary dowel, for if the dowel fits perfectly in the bed made in the recipient bone, it prevents rotation of the fragments, or fractured ends of the bones upon each other, which is very essential. The proper fitting of the transplant to the host, furnishes fairly good fixation. With an inlay transplant it is necessary to reinforce the fixation by bone-pegs, or by the use of kangaroo tendon sutures passed through the holes drilled in the host and the graft, and tied over, or around, the transplant. Wire, nails, or any other metallic substances should *never* be employed as a means of fixation, because they act as a foreign body, and retard osteogenesis, and sooner or later they act as an irritant(and may cause suppuration as long as *twenty years* after their application. This fixation should be accomplished only with autogenous bone pegs or absorbable material.

Before applying the transplant, it is quite essential to place the limb in such position as to neutralize muscular contraction or to put the muscles at rest. To neglect this important detail, will allow a spasmodic movement between the transplant and the host. The position of the limb or member operated upon, should be one of normal alignment and rotation, in which there is complete relaxation of the muscles acting upon the area of osteoplasty. Should the above not be carried out in detail, the irregular movements or leverages, will either dislodge the transplant, shear it across, or cause it to cut through its bed or host, the course depending upon the direction furnishing the least resistance.

In all cases where bone transplants are used, it is desirous to place the limb or part in as near a quiescent state as can be attained. To accomplish this purpose, numerous splints have been invented, and a number of fixed dressings used, but there is nothing that equals a close-fitting plaster-of-Paris cast. The cast is applied to, and should include one or more joints, above and below the osteoplastic repair. The fixation must be complete and continuous, until stable grafting, or bony union has occurred between the transplant and the recipient bone.

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

New York, December, 1919

SURGICAL LESSONS OF THE WAR.

If the Great War had been fought in the same manner and with the same weapons as the various, all too numerous wars that preceded it in this enlightened century, it seems probable that it would have developed no fundamental departures in medico-military practice, no great contributions to surgical science.

There were, however, two factors introduced into the recent warfare that profoundly altered the problems of caring for the wounded, the solution to which problems represent innovations and striking advances in the management of wounds—especially traumatic wounds—that are equally important in our civil practice.

The first of these factors was the general use of "high explosives," shell fragments from which caused very irregular lacerations of the soft parts (and shattering of the bone) and extensive "devitalization" of the tissues beyond the immediate tract of the projectile. The second factor was the richly fertilized, and therefore bacteria-laden, fields over which the war was fought—combined with the soiled condition of the soldiers' uniforms and undergarments. (The practice of bathing and change of clothing before a battle, introduced by the Japanese in their war with Russia, was quite impossible both in the trenches and in the later open operations of the last war.)

The combination of these two factors resulted in frightful wound infections—by streptococci and by gas-producing anaerobes—that were well-nigh universal and often fatal during the earlier years of the war: the prevention or management of which infections was the greatest surgical problem of the conflict. The ultimate solution of the problem is one of the most brilliant accomplishments in surgery, and ranks among the most important contributions to surgical progress in recent years.

The successful treatment of these war wounds was developed along two lines. The first of these was a reversion to antiseptic treatment, in the scientific evolution of which the wizard Carrel and his chemist associate, Dakin, were preëminent. It is quite unnecessary to rehearse the development of Dakin's hypochlorite solution and his later chlorine antiseptics, notably dichloramine-T; nor the nice and very scientific technic for their employment which Carrel and his associates evolved in their hospital at Compiegne. The very precision of those technics, and the organization of personnel it involved, discouraged and still seem to discourage many surgeons from employing the Carrel-Dakin system in their practice, despite the brilliant results early achieved by Carrel and by Depage. The beneficence of this method was amply demonstrated in our war hospitals where, for the most part, it was quite impossible to fully carry out Carrel's meticulous technic. Indeed, the timid surgeon may take assurance that he can secure results with the Carrel-Dakin treatment even without the desirable organization and ultra-precise methods of Carrel, provided he understands and carefully practices the fundamental principles involved in the preparation and in the dressing of the wound. More than that, it was found, for example, that Carrel's rule to delay secondary suture until wound smears show only one bacterium in five fields can be disregarded. A wound can be safely closed by secondary suture as soon as it is clinically clean, provided that smears show no streptococci or bacilli. This and certain other departures from Carrel's rules of wound closure were described in the interesting article by Bleier in the August, 1919, issue of the Journal.

The Carrel-Dakin method is not a guaranteed preventive of wound infection nor a sure cure of suppuration; but we are inclined to believe that many, at least, of those who may still pooh-pooh it have not familiarized themselves with its management. It seems to us, too, that no surgeons who wants to employ it can excuse himself on the ground of lack of facilities, provided that he can secure the proper preparation and preservation of the Dakin's solution or the dichloramine-T.

The second, and more important, development in the treatment of battle casualties was the procedure that came to be known as "débridement," but which can be better described as "wound excision," since it consisted, in addition to the removal of all foreign bodies, of excising all the tissues (except nerves and large vessels) immediately surrounding the tract of the projectile, usually also of small detached bone fragments and, too, of the free removal of all "devitalized" soft parts in the vicinity, however extensive that removal might need to be. Whenever possible the excision should be done "en bloc."

It was soon found that when this débridement, skilfully performed, was done within a few hours after the casualty was sustained, that is before "wound contamination" had become "wound infection," the defect could at once be closed by sutures, and that a large percentage of wounds thus excised and closed healed *per primam*. Indeed, primary wound suture after excision was thus performed in many cases in the British and, especially, in the French army—notably by Lemaitre, who is chiefly credited with the method. During an active "push," however, it was dangerous to perform primary suture in the forward hospitals, both because most of the patients had to be evacuated promptly on long train trips to the rear and because of the great fear of a lurking "gas gangrene" infection which might develop to fatal proportions in a wound thus closed before the soldier reached a base hospital. Indeed, primary suture was forbidden in the A. E. F., except of wounds of the head, the thoracic and abdominal cavities and the joints; and these latter cases were, as nearly as possible (and it was not always possible) retained in the Evacuation Hospitals for about ten days. No surgeon who worked in these forward hospitals will ever forget the odor of "gas gangrene" with which they often reeked, nor the fear of the possible development of this infection in his cases.

In civil practice these conditions do not obtain: the injured can be treated promptly and retained in hospital; the chance of gas gangrene infection is small and its possible development can also have immediate attention. Therefore, prompt excision and "primary suture" is quite applicable in a large percentage of the accidental wounds we are called upon to treat in civil practice. This, it seems to us, is the most important and most novel contribution of the war to traumatic surgery, the greatest boon conferred by experience in the conflict on the many who are injured in the industries, in traffic and by firearms. In the November, 1919, issue of the Journal we called attention also to the employment of the Carrel-Dakin treatment as a means to the safe immediate suture of divided tendons.

The most striking results of débridement and primary suture were to be seen in "gunshot wounds" of the joints. Here the débridement of the tract of the missile, even through the bone, the removal of bone fragments and of foreign bodies, and the immediate complete closure of the capsule, were followed in a brilliantly large percentage of cases by primary union without infection. Many men today are enjoying the possession of a perfectly functionating and strong knee, elbow or shoulder joint that once harbored a piece of shell and a wad of dirty clothing, with a fracture of the articular end of bone. The French introduced the practice of washing out with ether joints and, indeed, all wounds, after débridement. Willems added the important step in the management of joint injuries of insisting upon early, indeed immediate, *active motion*, after operation.

In the treatment of joint suppuration also and more especially, Willems' system of active movement after free incision, is very helpful. Even more important, however, was the institution of *long* incisions into the joint on each side and the avoidance of all drains or packings. When joint suppuration was an extension from an infected gunshot wound of the extremity, as of the knee from compound fracture of the tibia or the femur, these long lateral incisions were the only hope of saving the extremity from amputation. It was our personal observation in these late, usually streptococcic invasions of the knee-joint — always most threatening—that after liberal lateral incisions some got well even where the associated fracture made active movements impossible, while others continued to do badly in spite of active motions. It must be said that in any such case thigh amputation was an imminent probability to save the soldier from advancing sepsis; and it was one of the tragic lessons of the war that such amputation must not be long delayed.

The employment of suspension and traction in the management of fractures of the extremity is not new in surgery; but its elaboration into a fully developed system, the evolution of its technics, the demonstration of its advantages in securing full extension and in maintaining the function of the muscles and the joints, are distinct products of the war. They constitute a highly important advance in this field of traumatic surgery, quite as important for civil as for battle casualties. In fractures of the femur and of the humerus, especially, whether simple or compound, traction and suspension, governed in their application by bedside roentgenography, are certainly superior to immobilization in splints or plaster of Paris.

In the development of this system many made important contributions — Steinmann, Codavilla, Chutro, Finochietto, Delbet, Hennequin, and others, and, of course, such earlier surgeons as Thomas and Hodgens. But it is not detracting from the accomplishments of other surgeons in the war to mention, in this connection, especially Sinclair of the British Army and Blake of the American Army. We commend to all surgeons not already quite familiar with the system the reading of Colonel Blake's excellent and graphically illustrated compend *"Gun-Shot Fractures of the Extremities."* It is an elaboration of an earlier (1917) article by Joseph Blake and Kenneth Bulkley, *Traitement des Fractures des Membres au Moyen de la Suspension et de la Traction*, is published in English by Masson et Cie., Paris, and was among the war medicine publications issued by the American Red Cross.

The importance of applying a Thomas splint, on the battlefield, in all cases of fracture of the thigh and leg—especially of the femur—was one of the lessons learned in the war. In civil practice it means that every ambulance should be equipped with a Thomas splint!

Many other problems and developments in war surgery — osteomyelitis, jaw fracture, secondary hemorrhage, sepsis, the management of injury to the posterior tibial artery, the association of compound fracture with injury to a large vessel, aneurism, gas gangrene, gunshot wounds of the abdomen, burns by explosives and by gas—have been repeatedly reviewed in the literature and cannot be discussed within the limits of an editorial. (The reader is referred to the excellent articles that have appeared in the JOURNAL, e. g. *Arterio-Venous Aneurism and Arterial Suture,* by Raymond Grégoire, October, 1919; *Maxillo-Facial Injuries,* by Shipley and Dillon, November, 1919; *Full Exploration of the Thorax in Recent Wounds of the War,* by Lilienthal, August, 1919; and to the editorials on *Shock,* August, 1919, and on *Wound Diphtheria and Diphtheroids,* July, 1919.)

We may, however, say a passing word about certain other broad fields of war surgery endeavor. In amputations perhaps the most important contribution was the personal experience acquired by so many surgeons. The "guillotine" or "sausage" amputation was commonly practiced as the safest and quickest, especially for gas gangrene. It was, perhaps, slightly the quickest but has little else to commend it and much to condemn it. It will not survive the war and has no place in civil surgery. The Italians achieved some interesting results in "kinetoplastic amputations," by which they provided various skin-covered loops and prolongations of muscles, with which to move prosthetic attachments. It is a promising field but still in the experimental stage.

In gunshot wounds of the brain remarkable results were achieved by débridement of the bone and, by irrigation and suction through a catheter, of the brain itself. When the brain could be covered completely by dural suture or, sometimes only by skin suture, or by fascia transplantation (as practiced by Neuhof) the immediate results were good. If the brain could not be, or did not remain, thus covered, if the soldier was too early evacuated to the rear, the result was regularly bad.

Just as in the Civil War the studies of Weir Mitchell and Keen wrote altogether new chapters in our knowledge of the clinical manifestations of peripheral nerve injury, so in this last war the brilliant and painstaking observations of Mme. Athanassio-Benisty, of Tinel, Henry Meige, Pierre Marie, Sicard and others, have added innumerable data to the symptomatology of peripheral nerve injuries and have greatly modified our conceptions of the physiology of some of the nerves, of the pathology and the phenomena of interruption of their fibers, of the processes of repair and of the indications for treatment. Among others, the works of Tinel and of Mme. Benisty (except, perhaps, her latest, *Les Lesions des Nerfs, Traitement et Restauration*) are available in English translation. The results of surgical operations on gunshot injuries of the nerves have not yet been collated and digested. Briefly we may state, however, that there are two outstanding lessons: first, the importance of conservatism and, second, that wherever possible end-to-end suture, conducted with the utmost gentleness of manipulation, offers much better prospect of restoration than any graft or nerve-plastic operation.

In the surgery of the chest much indeed was learned: the management of hemothorax and of so-called "sucking wounds," the indications for and against operation, approach to and exposure of the lung, the removal of foreign bodies from and débridement of the lung, the extraction of missles from mediastinum, pericardium and diaphragm. Petit de la Villeon, working at the French naval hospital in Brest, with the assistance of the roentgenographer, Le Coniac, developed a unique method of extracting missiles from the lung, under the fluoroscope, by means of forceps thrust through a small incision in the chest wall. His article in this issue of the JOURNAL, presenting his results, the indications and contraindications and, in outline, the technic, explains the method and its rationale. It is, however, a method safe only in the hands of one who has repeated opportunity to develop the necessary experience and dexterity, and is scarcely applicable in the occasional case that the surgeon will encounter in civil practice.

A fruitful opportunity was presented by the war for the study of empyema thoracis, both as it occurred from gun-shot wounds and, especially, as it was seen in so many cases in the camps during the epidemics of measles and of "flu." The important lessons learned therefrom were: that it is dangerous to operate before the effusion has become frankly purulent, *i. e.,* before the lung has become adherent to the parietal pleura about the pus collection; that if Carrel-Dakin treatment of the cavity be instituted after the incision and conducted *lege artis* complete healing without secondary operations will usually follow; that frequent recourse to the Roentgen ray is important to the successful conduct of the case, as it is also, of course, in gun-shot injuries to the chest.

In the search for a remedy for gas gangrene Bull's serum, which appeared to be a specific antitoxin for the Welch bacillus, proved a failure in the war zone, for it gave no protection against the other gas-producing organisms commonly present. Other efforts, based on the recognition of the rôle of these other anaerobes were also failures. Just before the termination of hostilities, however, Weinberger, long at work on this problem in the Institute Pasteur, evolved a triple antitoxin which appeared to be curative. Chutro, in Paris, used it in several apparently desperate cases with striking results. Unfortunately, it appeared too late to be tried out on a large scale.

In plastic restorations, as of the face, no new principles were evolved, so far as we know, but quite remarkable skill was developed by several surgeons among those to whom this work was allotted.

Indeed, it should be said, finally, that among the very important contributions of the war to civil practice is the vastly increased experience in traumatic surgery of many surgeons in all the participating countries.—W. M. B.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

SURGERY IN STATE HOSPITALS.

In the development of state hospitals an effort is made to secure rational and humane care for the insane. For the most part it is true that owing to the prevalence of dementia precox these institutions are largely places of shelter for those bereft of reason until they are relieved by death. The percentage of cures resulting from treatment in state hospitals is exceedingly small, and the main gain therefor may be said to be the protection of the community against the hazards of the insane at large. According to H. M. Pollock, statistician of the New York State Hospital Commission, and E. M. Furbush, statistician of the National Committee on Mental Hygiene, the daily average population of the state hospitals for the insane, based upon the returns of January 1, 1918, was two million, nine hundred and sixteen. The total cost of maintenance for the year 1917 was approximately forty-four million dollars, the per capita cost being $247.-28. These figures, of course, are not indicative of the number of insane in the United States, nor do they suggest the reason for the increasing admission rate in such institutions.

With the term "hospital" there is usually bound up the idea of surgery, though it is probable that the surgical phases of state care have not received adequate attention. In *The Institution Quarterly,* Volume X, No. 3, S. W. McKelvey and C. C. Ellis in separate articles refer briefly to the necessity for organizing surgical clinics in all state hospitals. The purpose of such surgical services is not merely for the relief of physical conditions producing pain and discomfort, but for the removal of any annoying conditions which may be interfering with the development of a proper mental attitude on the part of the patient. As Dr. Ellis comments, we have no right to assert that a patient is hopelessly insane and therefor that it is useless bother to give surgical relief, unless of course the life of the patient demands it. It would be contrary to the spirit of surgery to refuse surgical aid for acute abdominal conditions, on the theory that an early death would be a blessing to the patient and his family, and a relief to the state.

Among all insane patients there exists an abundance of clinical material to which little attention is given but which demands the highest degree of care, particularly in view of the fact that the state assumes the responsibility for the physical and mental betterment of those comprising the population of the state hospitals. The mere fact of being an inmate of a state institution should not serve to lower the character of medical care given, but should on the other hand, guarantee a greater degree of interest and scientific service.

In any large institutional population there is bound to be a large variety of surgical conditions demanding diagnosis and treatment. There are possibly some difficulties in diagnosis owing to the necessity for depending upon objective symptoms and laboratory findings. There is no difference between the surgical technic employed in the operations upon the sane and the insane.

The character of the surgery must vary greatly and includes operative procedures upon the eye, ear, nose and throat, the treatment of accidents, and the relief of chronic conditions, such as hernia, hemorrhoids, prolapsus uteri, fibroids, infections of the gall-bladder and appendix, old depressed fractures of the skull, varicosities in various parts of the body and similar pathological states undermining vitality and reflexly influencing unhappily the mental state. Under these circumstances it is patent that the development of surgical work in state hospitals for the insane should be given encouragement and support.

Not merely in the interest of state institutions but because of the benefit to the general public, every advantage should be taken of the opportunities for studying the inter-relation between the mental and physical conditions of individuals before and after they have received the benefits of operative treatment. From the standpoint of widening the spnere of surgical usefulness there should be an extension of the surgical service of state institutions to the end that every inmate should have his physical state restored to its fullest potential of effectiveness and power. Insofar as may be possible there should be no untreated conditions for which surgical skill might afford a remedy.

To make the most of state hospitals, their value for teaching must be appreciated, and this should include demonstrations of the surgical benefits that can be conferred as well as an analysis of the physical factors entering into the causation and prolongation of mental disease. In the training and equipment of nurses, orderlies, and internes, it is equally important that the surgical requirements should be modern and up to date and that the surgical clinic should take its proper place in the scheme of hospital organization.

The vast population in state hospitals is not to be regarded as a group segregated merely in the interest of society but as a mass of unfortunate beings placed in an institution wherein is to be found all that medical and surgical skill can offer towards re-establishing them as rational, self-sustaining, law-abiding individuals.

Progress in Surgery

A Résumé of Recent Literature.

A Report of the Work Carried Out at the Radium Institute, London, from January 1, 1918, to December 31, 1918; Conclusion. A. E. Hayward Pinch. *Radium*, September, 1919.

This is a complete report summarizing all cases treated. The following extracts should be of interest.

Warts, Papillamata and Granulomata.—Radium is of the greatest possible use in effecting the removal of warts from situations where the excision or the employment of powerful caustics is to be deprecated, e.g., the eyelids, lips, urethra, penis, and labia.

Leukoplakia, whether of the mouth or vulva, is almost always much benefited by radium, and the pruritus which is so general a symptom in the latter situation is greatly relieved. The condition, however, exhibits a strong tendency to recurrence, more especially when the patient has suffered from specific disease.

The screening employed, and the length of exposures, have to be varied in accordance with the character of the lesion—thin and glazed, thick and opaque, ulcerated and fissured. In the early stages screening of 1-10 mm. of lead is employed, and exposures of one to two hours' duration given; in the later stages the screening is altered to 1 mm. of silver, and the exposures are of from six to eighteen hours over two or three successive days.

Many kinds of *skin diseases* are favorably influenced by radium irradiation.

The character of the treatment to be adopted varies within very wide limits, but, speaking in general terms, it may be said that when the disease is confined to the epidermis, e.g., eczema, psoriasis, lichenification, etc., the best results are usually obtained by short unscreened exposures of from three to five minutes' duration on each of three successive days, or one such exposure of ten to fifteen minutes' duration, the former method being preferable.

When infiltration of the corium or deeper tissues is present, e.g., xanthoma, mycosis fungoides, the later stages of xeroderma pigmentosum, fibroma, etc., longer unscreened or prolonged screened exposures are indicated.

Keloids and Vicious Cicatrices.—Radium rapidly produces great and permanent improvement in these conditions, especially when they have not existed for any length of time, and occur in young subjects.

The routine treatment consists in exposures of eighteen to twenty-four hours' duration with half-strength applicators, screened with 1 mm. of silver, the series being repeated at intervals of about six weeks.

A gradual, but steady, absorption of the keloidal or fibrous tissues occurs, and there is but little, if any, surface reaction. The tenderness and itching of the keloidal tissues if present usually disappears within a fortnight of the first treatment.

The radium treatment of *cavernous nevi* may be regarded as most satisfactory, and though the procedure is a somewhat lengthy one, screened exposures having to be given at six weekly intervals for six, nine, twelve, or more months, the result is always superior to that which could be obtained by any other measures. *Capillary nevi* are not so favorably influenced, and though the removal of a small capillary nevus may quickly be brought about by the employment of a destructive reaction of moderate degree, this method is not practicable in the case of large and widely distributed port wine stains by reason of the extensive scarring which would result. It is, however, often possible to reduce the tint of these lesions to a pale salmon-pink color, which is easily concealed by a slight covering of face powder.

Much care and experience are needed for the successful treatment of these cases. The factor of personal idiosyncracy is always a very pronounced one, and there is a great tendency to the appearance of telangiectases in the treated areas, which require to be destroyed with the electric cautery so soon as they develop.

Tuberculous Adenitis.—In the earlier stages, before caseation has occurred and fluctuation is appreciable, radium treatment is often of great value, as it will occasion shrinking, and fibrosis of the affected glands, thus postponing or averting the employment of surgical measures. Half-strength applicators screened with 1 mm. of silver are employed, the total exposure being of eighteen to twenty-four hours' duration, distributed over three or four days.

Tuberculosis of Skin (*Lupus Vulgaris*).—Cases of long standing which have proved non-amenable to Finsen light, *x*-rays, CO_2 snow, scarification, caustics, etc., are sometimes quickly and effectively cured by radium, and the treatment is well worthy of a trial when other methods have failed. Definitely ulcerated areas should receive unscreened exposures of one to one and a half hour's duration, and a destructive reaction produced. A smooth, supple scar results.

The indurated and non-ulcerated areas are best treated with prolonged exposures, the apparatus being screened with 1 mm. of silver or 2 mm. of lead, the screening and exposures being varied in relation to the extent of the induration.

Goiter.—Radium therapy is not to be advocated as a routine method of treatment for this condition, but in those cases where the usual medical treatment has failed to produce any benefit, and the patient has declined operation, it is worthy of a trial. The best results are to be anticipated in the simple parenchymatous type; cystic growths, and multiple dense fibro-adenomata are but little, if at all, benefited.

Exophthalmic Goiter.—The milder forms of this disease, unassociated with diarrhea, vomiting, rapid wasting, and extreme nervous exhaustion, do well under radium treatment, either alone, or as an adjunct to the usual medical measures.

Prolonged screened exposures should be given, but it is advisable to proceed cautiously at first, and not use too large an amount of radium, keeping the patient under careful observation for the first few months.

Not infrequently the immediate effects of the treatment are to increase the influx of thyroid secretion into the blood stream, thus producing a marked exacerbation of all the symptoms. In such cases it is advisable to decrease the amount of radium employed and the length of the exposures, and give smaller doses at more frequent intervals.

Fibroid Disease of the Uterus.—The menorrhagia and metrorrhagia, which are the usual concomitants of this condition, are almost invariably checked, sometimes completely abolished, by radium treatment. Some diminution in the size of the existing tumor may also be produced, but this result is not always obtained.

Prolonged exposures of thirty hours' duration are given, a 100-mgr. tube, screened with 2 mm. of lead and 3 mm. of rubber, being placed within the uterus—or in the posterior fornix if this be impracticable—supplemented with a plate of equal strength screened in similar fashion, and applied over the fundus.

In many instances one such series of exposures proves effective, in others two, three, or four series may need to be given at intervals of not less than four months.

The most suitable cases for treatment are those in which the patient is over forty years of age—so that the establishment of a premature menopause is not a matter of any very great moment—and the tumor is of moderate size, and not the site of any inflammatory or degenerative changes.

Chronic Metritis—Uterine Fibrosis.—This exceedingly obstinate condition, which so frequently defies all gynecological measures short of removal, often yields in a remarkable fashion to radium therapy. The metrorrhagia is cured, the menorrhagia lessened, and menstruation becomes normal in character.

Prolonged screened exposures of about thirty hours' duration are necessary, both intra-uterine and extra-uterine applications being employed.

In cases of long standing the exposures may have to be repeated three, four, or more times, a procedure which usually induces the premature establishment of the menopause.

Arthritis Deformans.—The daily administration of 250 cc. of radium emanation solution of a strength not less than 1.5 millicuries per litre, continues to give excellent results in selected cases of this disease. The patients who are most favorably influenced are those in whom fibrous, as distinct from osseous, changes are predominant, and in which the condition is infective, rather than traumatic in origin.

Cases of long standing with bony ankylosis, osteophytic formation, or ulceration of interaricular cartilages derive but little benefit beyond possible relief of pain.

Intentional Removal of Skin and Other Tissues Overlying Deep-Seated Inoperable Cancer, a Necessity for Effective Treatment with X-Ray or Radium.

With Report of Relative Absorption of Rays by Skin, Fat and Muscle, as Compared with Various Thicknesses of Aluminum. Emil G. Beck and G. W. Warner, Chicago. *Surgery, Gynecology and Obstetrics,* October, 1919.

Confronted with a recurrent carcinoma of the breast or neck, for instance, the surgeon is apt to be too pessimistic in regard to the possibility of helping the patient. Usually the patient is referred to a roentgenologist for radium or *x*-ray treatment. We hesitate to do anything further surgically because we feel that if the surgeon was not able to eradicate all of the cancerous growth at the first operation, a second operation is apt to be much more difficult and not likely to be as radical as the first one. While recurrent cancer is not a promising field for the surgeon, still we have not yet exhausted all of our efforts. Even in apparently hopeless cases something more can be done.

The authors report four cases in which this procedure was carried out, with good local results from radiation of the large exposed wound. They also point out that:

The skin absorbs about as much as does three-fifths of a millimeter in thickness of aluminum, which is considered by roentgenologists a substantial filter for the rays; one-half inch of fat would arrest on the average about as much of the rays as two-fifths of a millimeter of aluminum would filter; three-quarters of an inch of muscle is capable of absorbing all the *B*-rays from radium.

It is a well known fact that superficial malignant growths, such as epithelioma, respond readily to *x*-ray and radium treatment, while deep-seated malignant growths do not. The reason for this is very suggestive: the skin, fat, and subcutaneous tissues which usually overlie deep-seated cancer are strong filters for the penetration of the *x*-rays, they absorb most of the soft rays from the *x*-ray tube and allow only the hard rays, which is a small quantity, to penetrate deeply enough to reach the growth. Small quantities of radiation, instead of destroying the cancer-cell are apt to stimulate it to more rapid growth. Therefore it has seemed that if the skin and all the overlying tissue and as much of the growth as is feasible is removed and a large area left entirely exposed, and to this field is then applied either the *x*-ray or radium directly, we may obtain similar results in treating deep-seated carinoma as are usually obtained in treating superficial growths. In other words, our problem is to convert the deep-seated growth into a superficial one.

In an appended report, in which absorption was determined by an ionization method, Warner states: "It is usually unwise to attempt to draw a conclusion from incomplete data but it seems safe in this case to predict that a few centimeters of body tissues would act effectively as a screen for nearly all the soft rays, but would be quite transparent to hard rays. Hence if it be the soft rays that are valuable in therapeutics, the removal of parts overlying the diseased organ is quite essential; but if hard rays are the valuable ones, then removal of the overlying tissues seems unnecessary."

The Treatment of Uterine Cancer by Radium.

Henry H. Janeway, New York. *Surgery, Gynecology and Obstetrics,* September, 1919.

Janeway presents a very careful analysis of the statistics of operation upon cancer of the ceroix and body of the uterus. The actual figures deduced from a thorough study of obtainable data, he summarizes as follows: operability of carcinoma of the uterus 37 per cent; mortality of operations, 17 per cent; curability of cases operated upon (based on 5-year standard), 21 per cent; for all cases, 9 per cent. However, the general mortality must be considerably higher, as not all cases are operated upon by highly skilful surgeons. The impressions gained by many observers are that the primary mortality and subsequent dangers in the way of post-operative complications are so great, that the small percentage of cures does not justify the raidcal operation. In addition, it must be remembered that only few surgeons can perform the operation well.

Janeway then presents the recent statistics of radium treatment of carcinoma of the cervix, quoting authorities such as Wickheim, Doederlein, Kelly and Burnam, Barsh and numerous others; appending reports of 17 cases treated by himself.

His conclusions from the cases treated are expressed in his own words as follows: "A review of the cases reported in this paper, does not, of course, prove that radium is at the present time the method of choice for treating carcinoma of the fundus or cervix uteri. Taken, however, in conjunction with reports of other observers quoted in the literature, it suggests that in only a few years there will be ample proof, that radium is the method of choice in the treament of cancer of the uterus, at least of that most frequent form of cancer of the uterus, and the most difficult to manage, the cervix."

"Contrasting the immature record of radium, with the statistics of the operation, the fact that it has produced cures of two or four years' standing in cases too extensive for operation, that it has produced cures of three years' standing and over in a larger percentage of early cases than the operation has produced, one author claiming for it in this stage 100 per cent of cures; the fact that treatment by it in no way interferes with the patient's routine life, and subjects her to no risks; the fact that it is a remedy capable of being used by anyone possessing the simplest gynecological training, after receiving certain easily acquired technical instruction; contrasting these facts with the operative records, is not the time ripe to urge each county medical society to make the effort to place a supply of radium in its district?"

Further Observations on the Radium Treatment of Uterine Cancer.

Harold Bailey, New York. *The American Journal of Obstetrics,* September, 1919.

Bailey discusses at length the pre-operative and post-operative treatment of cancer of the uterus as well as the treatment exclusively by radium. He lays particular stress on the proper selection of cases and the necessity for having large doses of radium at hand. His conclusions are here presented:

Practically all of the cases that have a complete radiation of the local lesion, and the lymphatic and other involved tissue in the parametrium, pass through a period of improvement. In all but the more advanced conditions this improvement consists of a disappearance of the ulceration, a lessening or entire disappearance of the discharge, a gain in weight, and general improvement of their health. Undoubtedly their lives are lengthened. A number have some slight degree of rectal irritation, beginning a week or ten days after the treatment, and lasting two or three weeks. A few have a fibrosis of the pelvic connection tissue, especially at the bases of the broad and uterosacral ligaments. After a longer or shorter time of well being following the treatment, many of the cases have further development of cancerous tissue behind the vault of the vagina. In the effort to save these patients that have a retrogression after six or eight months, Bailey pushed the radium treatment of the parametrium, both by vaginal and by surface radiation to the highest limits of safety, and have thereby caused in many who now appear to be free from cancer, various types of pelvic sclerosis, both mild and severe. It was wise to recede somewhat from the massive dose given by the bomb applicator. This dose now is actually in the neighborhood of three-fourths of the maximum; the dosage in 1917 being about one-half the maximum.

The method in use permits of the entire treatment being given in a forty-eight hour period, and with only moderate discomfort to the patient. The local slough and signs of irritation in the vault of the vagina, seen so frequently in using the older method is now lacking in most of the cases.

The most spectacular results in the entire series were those of four Wertheim operations, which followed a month after the radiation. In three of these, no cancer cells were found in the uteri or parametrial tissue that was removed; and in the fourth case only a few markedly hydropic and degenerated cancer cells were present in the parametrium. It must be admitted that in these cases, at least, the radium caused the tumor cells to disappear even more thoroughly than ablation could have removed them. If such results could be looked forward to with any degree of regularity, then the very reason for the operation would cease to exist. It should be a very simple problem to settle, for all time, the relative merits of these procedures. Twenty-five consecutive cases, well controlled, would show how dependable are the results of this type of radiation. Without the removal of the uteri of some such number with a plan carefully followed, there will always be uncertainty, for even in the cases of this series, where there was every reason to believe that the patient would be restored to health, after a year one is dead, and two have massive involvement in their pelves that is apparently cancerous. The question at issue is not the cure, but whether radiation will cause the permanent disappearance of cancer cells, from a region as wide in its limits as the area that would be removed by the most complete hysterectomy of the Wertheim type.

From results in the uterine body cancers, it would appear to be necessary to remove the uterus after a preliminary radiation, or where this is inadvisable to radiate the entire pelvis as completely as is done with a cervical tumor.

The results in recurrent cancer are very promising.

Epithelioma of Solar Origin.

W. Dubreuilh, Bordeaux, France. *The Urologic and Cutaneous Review*, November, 1919.

Dubreuilh has analyzed over 400 cases of epithelioma and rodent ulcer, and senile keratoma, from which he infers that the exciting cause is undoubtedly chronic insolation. The details of these cases are presented, with the occupations of the patient and exact anatomic position of the lesion. While age is a predisposing factor, chronic insolation was demonstrable in nearly all the cases.

The following conclusions are drawn from the study.

Senile epithelioma of the face is not caused solely by age.

It is the result of chronic insolation, and the study of it should include chronic radio-dermatitis.

It occurs with particular frequency among farmers and others who live in the open, exposed to the full sun.

Blond persons having a skin of little pigment are much more subject to effects of the sun, while this is rare with brunettes and still more so with those of the colored race.

It is essentially a rural malady.

Is Carbuncle a Medical or a Surgical Disease?

Douglas H. Stewart, New York. *Indianapolic Medical Journal*, October, 1919.

Stewart calls attention to the decreasing frequency of carbuncle. He decries the principle that every carbuncle should be freely excised or curetted. He believes that a carbuncle is a "boil on a gangrenous base." Excision of the gangrenous area is contra-indicated unless a distinct line of demarkation has formed. The only indication for early operation is in those cases with extreme induration, pain, and severe constitutional symptoms.

The routine treatment employed by Stewart is to have the patient lie face down (usually) upon an operating table and to apply a compress soaked with a saturated solution of phenol that is left in contact for ten full minutes, while other patients are being attended to. This is for anesthetic purposes only and is removed when, if there are openings in the growth, they are injected with Stewart's biniodide solution, which contains one grain of calomel to two ounces each of alcohol, tincture of iodine and glycerine. The whole growth and its neighborhood is given a generous and extensive painting with the aforesaid solution, but the whole is finally covered with a compress soaked in "purple" (iodin gr. i. paraffin ℥ i). A carbuncle appears to be the sole surgical injury that is benefited by much handling with frequent change of dressing. That "purple" prevents the adhesion of the bandage may be a factor in this matter. At any rate the biniodide is applied three times a week and the purple soaked bandage is changed three times a day if time serves. The cases referred to are broken down from exposure, alcohol, lack of food, etc., therefor no pieces are removed save as they come free and are picked up with forceps. The frequent changes of dressing seem to militate against the chances of multiple infection. The only medicine that seemed to be of the slightest use was the well known Syr. hypophosyh, cum ferro, but this was excellent, therefore many other remedies were tried only to be soon discarded. Vaccines have been used rather extensively and have a very definite value if the dosage be large enough. The question is whether carbuncle does better under medical or surgical treatment; the answer is under medical measures, save only in those neglected cases in which the most urgent demand is to relieve tension.

The Importance of the Spleen in Resistance to Infection.

Dudley H. Morris and Frank Bullock, New York. *Annals of Surgery*, November, 1919.

The authors conducted an investigation to determine the rôle played by the spleen in combating infection. For this purpose they used rats, because they are more susceptible to the ordinary pathogenic microbes. Thirty-six young brindle rats, weighing from 50-100 grammes each were splenectomized under anesthesia. A similar number had one testicle removed. Both series were active and healthy on the day following operation. They were then exposed to chance infection, from laboratory contagion, and kept under observation for several months. The death rate in the splenectomized animals was 80.5% as compared with 38.9% in the controls. The autopsy findings were those usually found in rat plague. They deduce from these findings that the splenectomized rats were more prone to contract rat plague, and that having contracted it, they showed less resistance to its ravages. In another series of experiments, the authors showed that splenectomized rabbits were far more susceptible to common infections than control rats. In a third series, following injection of the bacillus of rat plague, the same lack of resistance in the splenectomized rats was noted.

The authors' conclusions are as follows: While rats may get along fairly well without the spleen in the absence of any infection, the reverse is the case when the organism is put to the strain of resisting acute bacterial invasion. The inference is that the spleen normally aids tremendously in resisting infective processes in rats, and that its removal temporarily robs the body of its resistance.

The surgical bearing of these results is obvious. If as we reasonably infer, the physiological processes of mammals are similar, it is not improbable that the human body, deprived of its spleen, shows a similar increased susceptibility to infection.

The Treatment of Unopened Mammary Abscesses. John P. Gardiner, Toledo. *American Journal of Obstetrics;* November, 1919.

In an exceedingly interesting article, which carefully covers the literature of mammary abscesses, Gardiner reports a new method of treatment of mammary abscesses, without incision, which possesses manifold advantages over the generally accepted method of incision and drainage.

1. Care of the lactating breasts and nipples means: (*a*) Cleanliness; (*b*) Avoidance of prolonged and frequent nursings during the first days before the milk comes in; (*c*) Early recognition of a failing milk supply and the immediate institution of supplemental feedings; (*d*) On the first sign of any trouble, nursing is to cease temporarily and the lymphangitis is combated by pressure and cold to the breast.
2. Drainage is accomplished by frequently repeated aspirations. Upon this one point plus constant pressure depends the success of this method of treating breast abscesses.
3. The second aspiration is performed four to six hours after the first aspiration. The amount of fluid, obtained at this aspiration, will determine the frequency of the following aspirations.
4. Each succeeding needle puncture is made through the original puncture and is always preceded by local anesthesia.
5. The time of healing in the cases reported was from four to nine days.
6. Abscesses contiguous to the original abscess are not difficult to locate, because the pressure exerted by the bandage prevents any excessive edema, so that any induration between the skin of the breast and the chest wall, is readily recognized by palpation. It is usually easy to drain, by aspiration, these contiguous abscesses through the original abscess cavity.
7. During the acute stages before the abscess has localized, it is essential that the pressure bandage should not be removed from the breast, except for the briefest time possible and the pressure bandage should be continued several days after there has been a dry tap.
8. Cold should be continuously applied unless pus is present, when heat is substituted.
9. From a psychological viewpoint, the aspiration method should be the method of choice, as there is practically no scarring to recall the patient's suffering.
10. Prenatal care of the nipples does not prevent the occurrence of sore nipples or breast abscesses.
11. Every nursing woman should be impressed with the fact that by caring for the breasts and nipples, at the very first sign of trouble, she may escape many days of acute suffering and also years later she may perhaps avoid the development of a mammary carcinoma.

Delivery by Hysterectomy Without Preliminary Opening of the Uterus. The Fetus Remaining Alive. [L; Accouchement par Hystérectomie sans Ouverture Préalable de l'Utérus, l, Enfant etant Vivant.] Rene Lecocq. *Annales de Gynécologie et d' Obstétrique*, October, 1919.

In cases where secondary hysterectomy would be indicated following a Cesarean operation, or after labor, Lecocq advises removal "en bloc" of the uterus with its fectal content, as if it were a huge fibroma; after the uterus is removed and the operation is being finished, the uterus is opened by an assistant, preferably in another room, and the child removed. This operation was first performed by Emile Raymond in October, 1911. It has been performed five times since. In each case the child was saved. In one case the mother died.

The indications for the operation are the same as for hysterectomy.

1. Probable infection of the uterus, because of necessary mechanical interference.
2. Large fibraid or cancer of the uterus.
3. Necessity for a rapid delivery in face of threatened rupture of the uterus.
4. Complete uterine inertia, occurring at the time when Cesarean operation is indicated.
5. Placente Previa with severe hemorrhages or bloody infiltration of the uterine musculature.
6. Prevention of accidents of osteomalacia.

The following points in technic are mentioned. A large sterilized basin should be ready for the reception of the uterus with its contents. All preparations should be ready for resuscitation of the child. Preparation of the patient as for a simple hysterectomy. A large obdominal incision, 23 to 25 cm. is made, the abdominal wall which is then carefully raised and the uterus delivered. The broad ligaments and round ligaments are clamped and divided. The peritoneum is incised near the cervix and pushed forward. The uterine arteries are exposed and clamped, and the uterus rapidly removed, with or without the cervix. The second uterine artery may be caught, after the uterus is removed, so as to maintain placental circulation as long as possible. The rest of the operation is like a simple hysterectomy. In the meantime the uterus is opened and the fetus removed and resuscitated if necessary.

The post-operative course is simple, and the complications are those of a simple laparotomy. There was only one maternal fatality in the five cases. The child lived in every case.

Are the Operative Procedures Done for Dysmenorrhea and Sterility Justifiable in the Light of Developmental Study. Frederick C. Halden, New York. *American Journal of Obstetrics*, October, 1919.

In the study of sterility and dysmenorrhea one should differentiate between those cases which are due to inflammatory disease and those which are the result of developmental defects. Unfortunately this distinction is not made by the average gynecologist.

The author is in accord with the statement of Garretson that the life of every woman is dominated by her ductless gland system. Certain of these glands assume a dominating influence on the morphology, physiology and pathology of the individual and by reason of this, we are able to designate persons in terms of glandular types recognizing thyroidal, adrenal, pituitary and gonadal types, many of which are mixed types and designated thyro-adrenal and pituitous renal.

But few cases of dysmenorrhea need any form of operation. It is fallacious to suppose that the pin-hole os, the long cervix, the anteflexed uterus have any actual etiological relation to painful menstruation, when one realizes that menstruation is not controlled in the uterus but by the ovaries. These abnormalities while they do not cause dysmenorrhea *per se*, cause a circulatory stasis which increases after marriage. This circulatory stasis produces a permanent pathology not only in the uterus but in the ovary. The uterus drops in the pelvis, is edematous and as a result there is a deposition of round cells which increases its bulk. The ovaries have their circulation interfered with and the same engorgement takes place within the stroma and the same deposition of round cells takes place within the capsula. This offers another obstruction to the follicular elements in their progress toward the surface and complete maturation, the result of which is dysmenorrhea. Such a continued state can give rise to but one symptomatology. To establish the proper circulatory relations within the uterus and ovaries, correction is necessary. When this is done, if the changes have not advanced too far, the ovaries are capable of reëstablishing their function. If they already have reached a degree of pathology where there are various multicysts on the surface, or where the tunica is immensely thickened, some surgical procedure will have to be used upon the ovary in order to favor the proper maturation of the follicles.

1. Operative procedures alone give a small percentage of successes.
2. Operative procedures sometimes add a troublesome pathological condition of the genital organs to the symptom-complex of dysmenorrhea and sterility.
3. The only intelligent method of studying the activity of the spermatozoa is in their relation to the female secretions.

4. Ductless gland therapy is at present in its embryonal stage. While the writer fully appreciates the dangers of the indefiniteness of this therapy, he does feel after careful consideration of a series of cases, of which those quoted are a type, that further experience with endocrines will tend to clarify our present position in regard to the treatment of dysmenorrhea and sterility.

Delivery by the Natural Passages Following Cesarean Section.

JOHN T. WILLIAMS, Boston. *American Journal of Obstetrics.* October, 1919.

After a review of the literature on Cesarean scars, there seems to be definite authority for allowing patients to go into labor, after having undergone Cesarean section for previous pregnancies. The types of patients which may thus be permitted to go into labor, are those in whom the indication for Cesarean section no longer exists (eclampsia, placenta previa, etc); and those in whom the operation was done for failure of the natural forces. In the latter case, the patient should be allowed to choose between the operation and natural labor.

The author's conclusions are as follows:

1. Sufficient evidence has accumulated to justify the conclusion that the presence of a Cesarean scar in the uterus is not sufficient reason for repeated Cesarean section in the absence of any other indication.
2. Cases delivered by Cesarean section for a temporary indication (eclampsia, placenta previa, inertia uteri, abnormal presentations, etc.) may be delivered by normal labor with safety if the scar has healed without sepsis.
3. Such cases should, however, be delivered in a hospital where equipment for abdominal section is accessible if needed.
4. All Cesarean wounds should be approximated with the greatest care, in order that a firm scar may be obtained and such a scar is in all probability equal in strength to any part of the uterine wall.

The Diagnosis of Tuberculosis of the Kidney.

DANIEL D. EISENDRATH, Chicago. *Southern Medical Journal,* November, 1919.

Eisendrath divides the cases of tuberculosis of the kidney from a clinical and diagnostic standpoint as follows:

1. Those cases in which the first symptom is more or less severe hematuria;
2. Those in which the symptoms of cystitis predominate;
3. Those in which symptoms exist which point directly to the kidney as the seat of trouble or there is a combination of renal and vesical symptoms;
4. Those with an apparently acute onset resembling through the presence of chills, fever and the local evidences, an ordinary pyogenic renal infection;
5. The so-called "silent" cases where there is loss of weight and strength, indefinite lumbar or abdominal pain and the presence usually of a tumor in the kidney region (cases of closed pyonephrosis); and
6. Those in which the appearance of a perinephritic abscess is the first symptom.

The most important data upon which to make a diagnosis of tuberculosis of the kidney are the following:

1. *Bladder Symptoms.*—(a) increased desire to urinate, at first often at night, but later diurnal; (b) painful urination, concomitant with the increased frequency, which gradually becomes more and more severe; and (c) incontinence or great irritability as the bladder involvement progresses, so that the patient is unable to control urination.

2. *Kidney Symptoms.*—There is either a dull ache or there are recurrent colicky pains on the affected side or on both sides in bilateral involvement. Enlargement of the kidney is a very unreliable finding. It may be absent altogether and the opposite kidney may be compensatorily enlarged. The same is true for tenderness over the diseased kidney. Rigidity is only found when there is an invasion of the perinephritic tissues.

3. *Fever.*—There is little as a rule unless there is a mixed infection present or a sudden retention.

4. *Urinary Findings.*—Pyuria may be present except in cases of closed pyonephrosis or in the early stage of mixed infection cases. Hematuria may be the first symptom or may appear with pyuria at intervals. Tubercle bacilli can be found in the urine in 80 per cent. of the cases by the Forssell or Crabtree methods.

5. *Cystoscopy and Ureteral Catheterization.*—This is the most important single method of diagnosis. Unless changes specific of tuberculosis are found in the bladder, it is best to suspend judgment until the urine obtained by ureteral catheterization has been studied by culture and staining method. Tubercle bacilli found in the urine obtained directly from the kidney constitute a very important factor in making the diagnosis.

6. *Pyelography and x-ray.*—These are very important and should be done as a routine in all cases if possible. They yield much information as to the changes in the renal pelvis and parenchyma.

Fulguration of Papillomata of the Ureter. [De l' Etincelage des Papillomes de l'Uretére.]

G. MARION. *Journal d' Urologie,* September, 1919.

The diagnosis of papillomata of the ureter can often be made. The diagnosis is suggested when hematurea continue after the destruction of vesical polyp, particularly if the polyp was near the ureteral orifice. The location of a ureteral polyp, can often be determined by a ureteral catheter, if on introducing the catheter gently there is a flow of blood, which ceases and gives way to clear urine when the catheter is pushed further up. Polyp is also suggested, when there is a sudden flow of urine, due to an obstructive hemato-hydro nephrosis.

The treatment consists in fulguration. The electrode is introduced to the point at which it touches the polyp. The point may be previously determined by ureteral exploration. The author was able to cure two cases of polyp in the middle third of the ureter by this method. The location of the polyp is determined by the point at which there is clear urine, above the level at which bloody urine was previously obtained, or the point at which there is a sudden flow of bloody urine.

Epididymotomy Treatment of Acute Gonorrheal Epididymitis.

BRANNON T. HUBBARD, Montgomery. *Southern Medical Journal,* October, 1919.

As a result of several months experience at Camp Pike, the author believes that in the moderate and severe cases of epididymitis, the best immediate and remote results are obtained by epididymotomy.

The operation is described as follows. An masion one and one-half to two inches in length was made in the anterior and upper part of the scrotum in the affected side and carried down to the tunica vaginalis. The point at which the tunica is reached is not always easy to recognize when the tunica is thickened and infiltrated, as often happens when the condition has lasted several days. The tunica vaginalis having been reached, it is then separated best by blunt dissection with Mayo scissors from the surrounding tissues and the scrotal contents with their enveloping tunic are delivered. The tunica vaginalis is then opened, care being taken not to injure the testicle as the tunica is often adherent to the testicle. However, in the first few days of the disease, there is more or less serofibrinous effusion present. The serous membrane having been freely opened and turned back, the inflamed epididymis is exposed.

In the first two or three days of the attack the epididymis is found greatly swollen, purplish-red in color, the process being chiefly in either pole, but often the whole epididymis is involved. Unless the inflammation is mild and subsides rapidly suppuration usually takes place. Occasionally an abscess forms, which discharges externally, but usually the pus is slowly absorbed, leaving the well-known area of induration.

With a cataract knife or the sharp point of a scalpel numerous incisions are made in the serous covering of the epididymis, through which a needle is introduced and passed through the epididymis. In early cases only bloody serum escapes. Later on, a few drops of thin pus and sometimes abscesses of various sizes are evacuated. It would seem that the best time to operate is in the first three days before suppuration takes place. By relieving the pressure within the epididymis the suffering of the patient, which is most severe, is alleviated and suppuration and consequent obstruction of the canal are obviated. It may be argued that penetration of the epididymis may in itself do damage; but it seems logical to suppose that a clean puncture will heal with less chance of obstruction than that caused by the formation of an abscess. If thought necessary, a silk-worm gut suture is run through the epididymis as a drain. Hagner put in a drain and sewed the tunica back in its natural position. As pointed out to me by Major George Day, this leaves the chance of a future hydrocele, which is not unusual after epididymitis. To obviate this, the tunica is resected close to the epididymis and the edges stitched with fine catgut. The scrotum is then closed with three or four stitches of silk-worm gut, one or two drains of small rubber tubing or gutta percha being inserted and left for two days.

The advantages of the operation, are:

1. Immediate relief of the intense suffering;
2. Shortening of the disease;
3. Continuation of the treatment of the urethritis;
4. Less recurrence; and,
5. Less likelihood of sterility.

The Tyranny of the Wassermann Test. H. Lisser, San Francisco. *The Journal of Cutaneous Diseases,* November, 1919.

Lisser attempts to solve difficult problems that confront the practitioner, as to the relation of the Wassermann test to anti-syphilitic therapy. He lays particular stress on the fact that patients with negative Wassermann reactions often require treatment, while many cases in the tertiary stage with positive Wassermann reactions require no treatment. His conclusions follow:

1. A strongly or definitely positive Wassermann reaction is undoubted evidence of syphilis.
2. It is an invaluable aid in the diagnosis of syphilis, especially in those cases where physical diagnosis does not reveal positive evidence of the disease.
3. A negative Wassermann reaction means exactly nothing, (*a*) It does not prove the absence of syphilis, because negative reactions occur in cases urgently requiring treatment. (*b*) Therefore it cannot denote a cure in treated cases.
4. A positive Wassermann reaction means syphilis, but not necessarily active syphilis.
5. Once the diagnosis of syphilis (after the primary stage) is established, the patient should be properly treated from two to four years, depending on the stage of the disease and the severity of the lesions.
6. Treatment should be entirely independent of the Wassermann reaction because negative Wassermann reactions sometimes occur prematurely during treatment, while positive Wassermann reactions frequently persist long after clinical cure.
7. Once the diagnosis of syphilis is positively established, the fewer Wassermann tests done the better, for the peace of mind of both the patient and the physician.
8. The Wassermann test should be employed as an aid to clinical judgment, but not to supplant clinical common sense.

Life Expectancy after Gastric Ulcer Operations. Donald C. Balfour, Rochester, Minn. *Annals of Surgery,* November, 1919.

From statistics in over 2,000 cases of gastric and duodenal ulcer, Balfour proves a very striking fact, *i. e.,* that in the first two years following operation for duodenal ulcer, the mortality is only that of the general population group, while after the second year, the mortality is actually less than in the general population group. His statistics illustrate in addition, a fact which has been generally recognized by surgeons, namely, that gastric ulcer is a much more serious condition than duodenal ulcer, not only from the operative standpoint, but from the standpoint of after-results, and that a patient with a gastric ulcer, shows as a rule much more evidence of impaired general health than the patient with duodenal ulcer.

The detailed summary of results is as follows:

1. The percentage of operative deaths in the hospital following operations for gastric ulcer was fully twice that following duodenal ulcer, but the percentage in both cases was very low considering the seriousness of the condition.
2. The mortality during the three years following the operation among persons operated on for gastric ulcer was three times as high as that among persons operated on for duodenal ulcer.
3. The mortality among persons operated on for gastric ulcer, decreases relatively after operation, but the data are not sufficient to determine the number of years which must elapse before the death rate is similar to that of the general population.
4. The mortality among those operated on for duodenal ulcer in this series was less than that among the general population.
5. The average age at the time of operation for gastric ulcer was 47 for men and 43 for women; for duodenal ulcer, 44 and 42 respectively.

Empyema. J. Stewart Rodman, Philadelphia. *Pennsylvania Medical Journal,* November, 1919.

Rodman sums up his experiences with the post-influenzal empyemas, that occurred at Camp Bowie and at Ft. Ogelthorpe. He refers only to those cases due to the hemolytic streptococcus, following influenzal pneumonia. His treatment follows in the main, the principles of surgical treatment elaborated during the epidemic, viz., repeated early aspirations and operation only in the later stages after the development of frank pus. The technic when operation was necessary, was as follows:

Wide resection, 2 to 3 inches of the eighth or ninth rib in the posterior axillary line; introduction of four Carrel tubes, two upward and two downward, each tube having twenty perforations; immediate irrigation with 0.5 per cent. Dakin's solution (full strength) on the table, leaving the wound wide open and packing with gauze soaked in Dakin's solution, tight enough to steady the tubes, and protecting the surrounding skin with sterilized vaselin. A rather voluminous dressing is then placed over the wound and the patient returned to bed. Instillation of 100 c.c. Dakin's solution every two hours by the nurse and irrigation daily at the dressing complete the procedure. The results of this treatment were striking; the toxemia almost immediately disappeared; the character of the discharge became less purulent almost from the start. The Dakin's solution dissolved out the large fibrin masses and the wound could usually be closed after such chemical sterilization in from ten days to three weeks. A normally expanding lung remained and the soldier returned to full duty. The marked shortening of the convalescence and the early return to duty were certainly worth the extra trouble which this technic entails.

Pulse Pressure in Traumatic Cerebral Compression. Harry M. Armitage, Chester, Pennsylvania. The *Pennsylvania Medical Journal,* November, 1919.

As a result of investigations conducted in a large number of cases of cerebral compression due to trauma, the author presents the following conclusions in reference to the blood pressure findings in this type of case.

In severe fractures of the base with widespread hemorrhage, the blood pressure symptoms are valueless.

In traumatic cerebral compression where the local symptoms suggest a blood clot or a depressed fracture pressing on the brain as evidenced by roentgen ray, palpation or paralysis, the general symptoms such as slowed pulse and blood pressure findings may be of little value if the medulla is not involved by pressure. Operation is the only rational treatment in these cases.

In cases with major symptoms of choked disk, headache, disturbed sensorium, coma, increased pressure of the cerebrospinal fluid as registered by the spinal mercurial manometer, and slow pulse, we invariably find a high pulse pressure.

The systolic pressure is too uncertain a factor to be of any value whatever in diagnosing the amount of pressure.

Decision as to whether a patient should be trephined should be determined after grave reflection and consideration of the entire group of symptoms, but in all cases of head injury frequent estimations of the pulse pressure and pulse rate should be made.

The issue is unmistakable.

The subject has passed out of the realms of thought and presents itself as a clean-cut fact.

Where we have an increasing pulse pressure and a falling pulse, an operation should be performed without any delay, in traumatic cerebral compression.

Roentgenography of the Brain after the Injection of Air into the Spinal Canal. Walter E. Dandy, Baltimore. *Annals of Surgery,* October, 1919.

Dandy presents an interesting series of plates, and experiments, which undoubtedly will offer a distinct aid to the diagnosis of diseases of the cord, brain, and appendages. A small quantity of fluid is withdrawn and an equal amount of air, injected into the spinal canal. This process of substitution is repeated until the fluid ceases to appear on aspiration. The head of the patient must be elevated at least 20% above the needle. This position allows the fluid to descend to the level of the needle as the air is injected.

As a result of these experiments, the following points were clearly brought out:

1. By substituting air for cerebro-spinal fluid through a lumbar puncture, all parts of the sub-arachnoid space can be clearly seen in a roentgenogram.
2. Not infrequently, an air shadow, will completely surround the cerebellum, showing clearly its size and shape.
3. The spinal cord can be seen, surrounded by a column of air.
4. The cisternae appear as large collections of air at the base of the brain, the cerebral sulci as a network of tortuous filaments of air.
5. After an intra-spinous injection of air, provided that the sub-arachnoid space is intact, the air will fill the cerebral sulci.
6. But if the cisternae are blocked at any point by tumor or adhesions, the air will not be able to reach the cerebral sulci.
7. The exact position of the obstruction in the cisternae can often be seen in the radiogram. In one of the cases of communicating hydrocephalus the obstruction was in the cisterna pontis. In a second case of communicating hydrocephalus the cisternae were patent, but all except one or two of the main branches were occluded. In a third case a tumor was located in the midbrain solely by the means of the radiogram.
8. In a case of hydrocephalus, air passed from the spinal canal into the lateral ventricle, demonstrating the patency (and dilatation) of the foramina of Magendie and Luschka, the aqueduct of Sylvius and the foramen of Monro.
9. A case of hydrocephalus was cured by constructing a new foramen of Magendie. Six weeks later, air injected into the ventricles passed through the new foramen, showing that it was still functioning. The air also filled the cerebral sulci showing that the entire arachnoid space was patent.

A Study of Autopsy Records. C. B. S. Gibbs, Syracuse. *New York Medical Journal,* November 15, 1919.

Gibbs has analyzed the autopsy findings in over 160 cases of head injury, and has correlated these with the etiological factors and symptoms. From this study, several inferences can be drawn, as indicated in the following conclusions.

1. Traumatic injury to the brain of sufficient severity to cause death may occur without fracture of the cranium.
2. Fractures of the skull in children tend to be more localized and less radiating than in the adult.
3. In the series of cases studied, in order of frequency, the vault and base together rank first, the base alone second, and the vault alone last.
4. Fracture of the anterior fossæ occurred more frequently in this series than fracture of the other fossæ.
5. Fractures may often be seen or felt in a scalp wound, or may be exposed by enlarging the wound, or by exposing the cranium beneath the area of traumatism.
6. Fractures usually start at the point of impact and tend to travel downward to the base, not being deflected by sutures.
7. In fifty-nine per cent. of cases of fracture of the middle fossæ hemorrhage from the ear was observed to have occurred.
8. Subconjunctival hemorrhage may be present without fracture, and absent in cases of fracture of the anterior fossæ, but in the majority of cases it indicates fracture of the anterior fossæ across the orbital plate.
9. Injury to brain tissue may occur at the pole of the brain opposite the point of impact.
10. Laceration of the brain occurred in twenty-eight per cent. of the cases.
11. Meningitis occurred in 10.9 per cent. of the cases, and in the majority of these the streptococcus was found.

Operations for Acute and Sub-Acute Mastoiditis: Results in a Series of Sixty-Five Cases. I. H. Lillie and R. A. Barlow, Mayo Clinic, Rochester, Minn. *The Journal-Lancet,* November 1, 1919.

The indications for surgical treatment in mastoiditis are as follows:

1. Displacement of the auricle outward without furunculosis, which always means invasion of the soft parts over the mastoid cortex.
2. Discharge persisting for more than five weeks without a tendency to subside. Such a condition, except in young children, invariably means involvement of the mastoid, even though there is no pain over the mastoid. Such an ear, if untreated, becomes the chronic discharging ear. Usually, in this type there is more or less night pain.
3. Marked mastoid tenderness and pain which does not diminish in a few days following free drainage of the middle ear. We have all seen cases which appeared definitely surgical before paracentesis, in which the patients get well following free paracentesis; middle ear drainage should, therefore, be used first.
4. Development of symptoms of sepsis after ruling out other possible factors, such a pyelitis in little girl patients, central pneumonia, and conditions that might cause a septic type of temperature. If the patient has acute otitis, and if there is involvement of the sigmoid sinus, well-directed surgical interference is imperative.
5. Development of symptoms of meningitis in the presence of otitis.
6. Development of symptoms of labyrinthitis in the presence of acute otitis.

From a study of the results in these cases the authors conclude that:

1. In case of definite mastoiditis operation is indicated reasonably early. The mortality is practically nil.
2. Preservation of the hearing function is fairly certain.
3. A second operation should not be necessary, except for a complication, such as sinus thrombosis or brain abscess.

Operation for Fistula in Ano Without Division of Sphincter (Elting), With Report of Cases. G. T. Tyler, Greenville, S. C. *Southern Medical Journal,* October, 1919.

Tyler reports gratifying results in operations for fistula in ano without division of the sphincter.

To those familiar with the Whitehead operation for hemorrhoids, this one will not be difficult. The fistulous tract is located, the sphincter well dilated, and the bowel circumscribed at the muco-cutaneous junction. It is dissected freely, beyond the internal opening of the fistula, until the healthy gut can be brought down for suture to the skin. That part below the fistula is removed and the bowel attached to the skin by interrupted silk sutures. A rectal plug is inserted to prevent oozing. The external opening of the fistula is enlarged, the tract curetted, and a small drain inserted for three or four days. In two weeks most fistulas are healed, though some require much longer. longer.

In one case the procedure was modified. Here the internal opening was just within the external sphincter. By dissecting the bowel on the side of the fistula, the other side being quite normal, a complete Whitehead operation was not performed but Tyler was able easily to bring down enough bowel to free the internal opening of the fistula, and to suture on one side without disturbing the other. The outcome in this case was very good.

Book Reviews

Colloids in Biology and Medicine. By PROF. H. BECHHOLD, Member of the Royal Institute for Experimental Therapeutics in Frankfurt a/M. Authorized Translation from *The Second German Edition,* with Notes and Emendations by JESSE G. M. BULLOWA, A.B., M.D., Assistant Clinical Professor of Medicine, Fordham University. Octavo; 435 pages; 54 illustrations. New York: D. VAN NOSTRAND COMPANY, 1919.

The translation of Prof. Bechhold's book is most timely, as the growth in interest in colloids has been rapid, and adequate volumes upon the subject have been lacking. The work of the translator has been excellently done and the general contents of the volume has been enriched by his numerous annotations and references to American literature.

The introduction deals with the nature of colloids, their physical properties, the phenomena of colloids, and the method of colloid research; the second part deals with the biocolloids as carbohydrates, lipoids, proteins, and enzymes. A valuable chapter is devoted to immunity reactions.

Part three undertakes a discussion of the organism as a colloid system, and discusses metabolism, the nature of the cell, problems of circulation and respiration, secretion and excretion, absorption together with a most suggestive chapter on toxicology and pharmacology.

From the standpoint of illustration and exposition, the needs of the student are amply supplied, and a subject that is essentially technical is presented in a most readable and graphic manner. Credit must be divided between the original writer and the translator, whose ability has made this subject valuable to the English reading public. As an authoritative volume, it is to be unhesitatingly recommended, and merits consultation by all investigators into the problems of colloidal medicine.

Problems of Fertilization. By FRANK RATTRAY LILLIE, Professor of Embryology, University of Chicago. Duodecimo; 278 pages; illustrated. Chicago: THE UNIVERSITY OF CHICAGO PRESS, 1919.

This little book is an epitomé of the work done to clarify the subject of fertilization. It is a clear and very readable exposition unusually free from unnecessary technicalities, and it can be highly recommended to any one desiring to obtain a general view of this interesting field. The treatment is also sufficiently complete to interest the medical public and specialists in biology.

Lillie has incorporated a large amount of his own researches which tend to show that fertilization is due to the action of a substance which he denominates "fertilizin." This substance exerts an agglutinating action on the spermatozoon and likewise an activating action on the egg. In terms of the side chain theory "a three body reaction takes place between the sperm receptors, fertilizin and the egg receptors linked in line." Considerable discussion of Loeb's theory of activation will be found throughout the book and Lillie's thesis may be considered a defense of his own views.

In a review it is impossible to even touch upon the many interesting details (morphological, physiological, biological and physico-chemical) which are dealt with The fields of sterility, hybridization, inheritance, compatibility, etc., are trenched upon.

This book should be read with special interest by genito-urinary, gynecological and obstetrical specialists who will gather from its pages many new ideas relating to the fundamental principles which control and govern fertilization, even though only the lower forms of animal life are considered.

Menders of the Maimed. The Anatomical and Physiological Principles Underlying the Treatment of Injuries to Muscles, Nerves, Bones and Joints. By ARTHUR KEITH, M.D. (Abdn.), F.R.C.S. (Eng.) LL.D. (Abdn.), F.R.S., Conservator of the Museum and Hunterian Professor, Royal College of Surgeons, England. Small octavo; 335 pages; illustrated. London: HENRY FROWDE, HODDER & STOUGHTON. OXFORD UNIVERSITY PRESS, 1919.

In this book, Keith has attempted something quite novel. He has expounded the fundamental principles underlying orthopedic surgery from the historical point of view. In orderly succession, he takes up the lives of those who have made orthodepic surgery what it is, explaining the contributions of each and tracing the development and modifications of each principle in successive thoughts and practice. Thus Keith begins with John Hunter who insisted upon the power of nature to heal and who formulated the principle of rest in the healing of injury. He passes to Hilton, Thomas, Marshall Hall, Duchenne, Duhamel, Ollier, Sayre, Wolff, etc. Chapters are devoted to tenatomy, bone growth, muscle and nerve transplantation, degeneration of nerves, gymnastics and massage, bone grafting, etc. The book is more than a mere history of orthopedics. It is a masterly exposition and summary of all the great problems underlying orthopedic surgery in the light of our present understanding. It is therefore a work of reference as well as a history.

Vicious Circles in Disease. By JAMIESON B. HURRY, M.A., M.D. (Cantab.) Author of "Poverty and Its Vicious Circles," etc. *Third Edition.* Octavo; 377 pages; with diagrams. Philadelphia: P. BLAKISTON'S SON & CO., 1919.

Familiarity with vicious circles in medicine is recognized by clinicians and pathologists as the basis of understanding disease cycles. Dr. Hurry presents in his monograph, an excellent résumé of present-day knowledge concerning the biological interactions common to all organized tissues. In the third edition particular stress has been placed upon methods of breaking the vicious circle through the administration of drugs, the use of hygienic measures, the application of mechanical supports and the employment of surgical procedures.

The aim of the volume is distinctly practical, seeking to raise the standards of diagnosis, prognosis, and treatment through a keener insight into organic interdependence and the reciprocal influence of organic dysfunction.

The descriptive text, supplemented by excellent though simple diagrams, serves to illumine our understanding of the mechanism of disease processes in the light of physiological and pathological action.

Books Received

Wade in, Sanitary! The Story of a Division Surgeon in France. By RICHARD DERBY, Lt.-Col., M.C., U.S.A., Division Surgeon, Second Division. Duodecimo; 260 pages; illustrated. New York and London: G. P. PUTNAM'S SONS, 1919.

The Exact Diagnosis of Latent Cancer. An inquiry into the True Significance of the Morphological Changes in the Blood. By O. C. GRUNER, M.D., Leeds. Author of "Biology of the Blood Cells," "Studies in Puncture-Fluids," "A Code System in Pathology," etc. Octavo; 79 pages; illustrated. Philadelphia: P. BLAKISTON'S SON & CO., 1919.

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